



FIELD MUSEUM OF NATURAL HISTORY

FOUNDED BY MARSHALL FIELD, 1893

PUBLICATION 271

REPORT SERIES

VOL. VIII, No. 1

ANNUAL REPORT OF THE DIRECTOR

TO THE

BOARD OF TRUSTEES

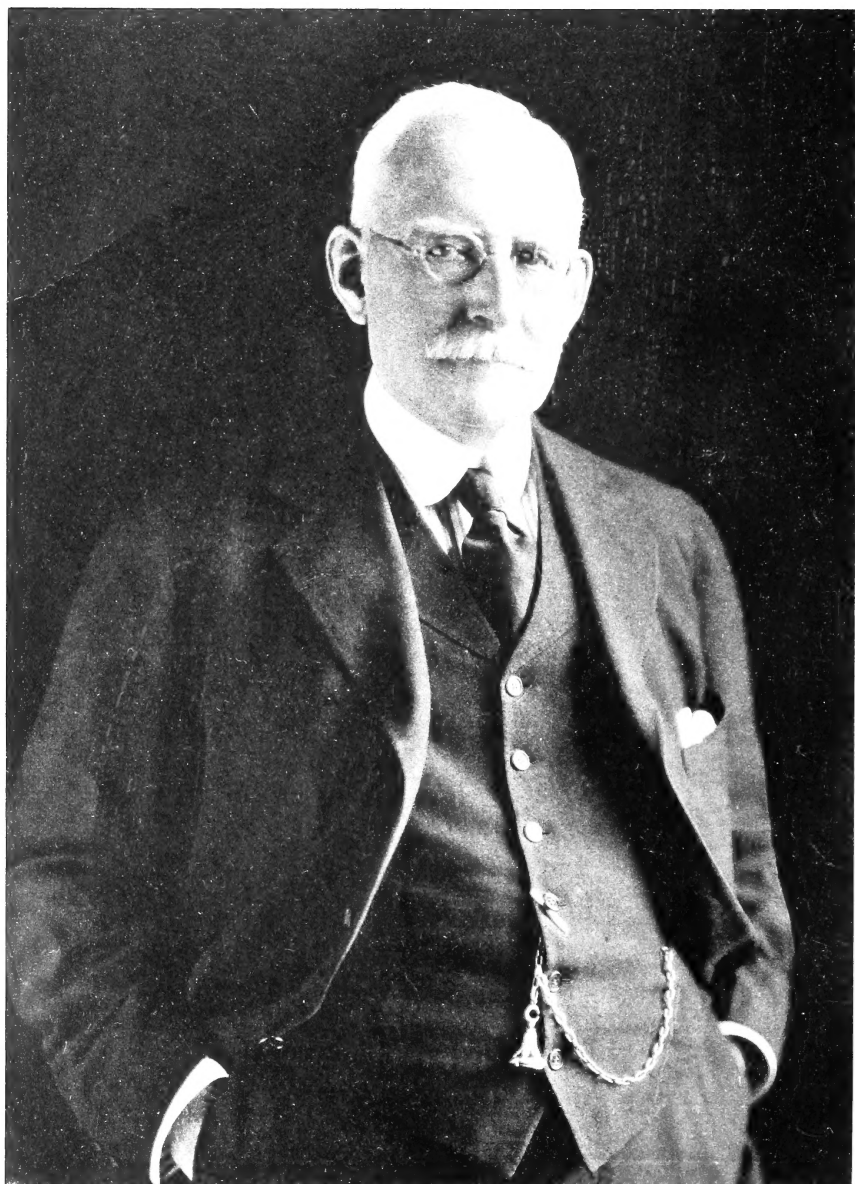
FOR THE YEAR 1929



CHICAGO, U. S. A.

January, 1930

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THE LATE CHAUNCEY KEEP

A Trustee of the Museum from 1915 until his death on August 12, 1929

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CHICAGO, U. S. A.

January, 1930

W. J. G. G.
A. B. B. B.
C. G. G. G.

BEQUESTS

Bequests to Field Museum of Natural History may be made in securities, money, books or collections. They may, if desired, take the form of a memorial to a person or cause, to be named by the giver. For those desirous of making bequests to the Museum, the following form is suggested:

FORM OF BEQUEST

I do hereby give and bequeath to Field Museum of Natural History of the City of Chicago, State of Illinois, _____

Cash contributions made within the taxable year to Field Museum of Natural History to an amount not in excess of 15 per cent of the taxpayer's net income are allowable as deductions in computing net income under Article 251 of Regulation 69 relating to the income tax under the Revenue Act of 1926.

Endowments may be made to the Museum with the provision that an annuity be paid to the patron during his or her lifetime. These annuities are tax-free and are guaranteed against fluctuation in amount.

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SHARAT K. ROY, *Assistant Curator of Invertebrate Paleontology*

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H. B. CONOVER, *Associate in Ornithology*

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KARL P. SCHMIDT, *Reptiles*

R. MAGOON BARNES, *Birds' Eggs*

ALFRED C. WEED, *Fishes*

EDMOND N. GUERET, *Vertebrate Skeletons*

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WALTER A. WEBER, *Assistant and Artist*

DWIGHT DAVIS, *Assistant in Osteology*

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CHIEF ENGINEER

W. H. CORNING

WILLIAM E. LAKE, *Assistant Engineer*

ANNUAL REPORT OF THE DIRECTOR

1929

To the Trustees of Field Museum of Natural History:

I have the honor to present a report of the operations of the Museum for the year ending December 31, 1929.

It is most gratifying to be able to report an attendance for the year which breaks all records in the history of the Museum. The total number of visitors during 1929 was 1,168,430. This figure represents an increase of 144,803 over the attendance in 1928, and 122,884 over 1927, the latter year's attendance having been the largest previously attained in the Museum's history. It is worthy of note, too, that the 1929 attendance marks the third successive year in which the number of visitors has exceeded one million. Such impressive and encouraging figures indicate a response on the part of the public to the Museum's activities which makes it certain that the institution is fulfilling its great mission of disseminating knowledge of the natural sciences on a broad scale. Attendance of this size is, further, a tribute to the farsightedness of the Founder of the Museum, and the many others through whose generous benefactions it has been possible to carry on the work on an ever expanding scale.

The highest attendance for any single day in the history of the Museum was also achieved during 1929, on Friday, May 24, when the Museum received 59,843 visitors.

A large part of the increase in the Museum's endowment, and an increasing part of the institution's operating funds, are derived from the many contributions received in the form of memberships. Renewed expressions of gratitude therefore are due to the many persons who have evidenced their interest and good will in this manner. On December 31, 1929, the Museum had on its membership rolls 5,781 names, a number exceeding that of any previous year. As the increased attendance indicates a growing appreciation by the public of what the Museum is doing for it, the increased membership indicates a growing realization of the value and importance of the services rendered the public and a disposition to cooperate in promoting their success. Every membership represents a contribution

which is deeply appreciated by the administrative officials of the Museum. The lack of such support would cause a serious curtailment in the institution's work.

In recognition of the extremely valuable and eminent services rendered the Museum by Mr. Richard T. Crane, Jr., and Mr. Cornelius Crane, the Trustees during 1929 voted to add their names to the list of Benefactors; and this has been done in accordance with the Trustees' order.

In recognition of eminent services rendered to Science, the Board of Trustees elected the following persons as Honorary Members of the Museum: Mr. William V. Kelley, Mr. Frederick H. Rawson, Colonel Theodore Roosevelt, Mr. Kermit Roosevelt, and Mr. C. Suydam Cutting.

In recognition of their eminent services to the Museum, the Trustees elected the following persons as Patrons of the Museum: Mrs. Stanley Field, Mrs. Evelyn Field, Mr. Samuel Insull, Mr. Arthur S. Vernay, Colonel J. C. Faunthorpe, Captain Harold A. White, Mr. Walter A. Strong, and Major John Coats. With regret it is recorded that, shortly after his election, Colonel Faunthorpe died.

The following were elected as Life Members of the Museum: Mr. Max Adler, Mr. Alfred S. Austrian, Miss Florence Dibell Bartlett, Mrs. Jacob Baur, Mr. Edward J. Bermingham, Mr. Chauncey B. Blair, Mr. Rush C. Butler, Mr. Wayne Chatfield-Taylor, Mr. James D. Cunningham, Mr. Charles G. Cushing, Mr. Henry M. Dawes, Mr. Rufus C. Dawes, Mr. Edward J. Doyle, Mr. Louis Eckstein, Mr. George B. Everitt, Mr. Calvin Fentress, Mr. Charles Fernald, Mr. Milton S. Florsheim, Mr. Huntly H. Gilbert, Mr. Charles F. Glore, Mrs. Ernest A. Hamill, Mr. William F. Hayes, Mr. Frank P. Hixon, Mr. James C. Hutchins, Mr. Martin J. Insull, Mr. Theodore E. Joiner, Mr. D. F. Kelly, Mr. William H. Kidston, Mr. Alexander Legge, Mrs. Albert F. Madlener, Mr. Eames MacVeagh, Mr. John E. MacLeish, Mrs. Cyrus McCormick, Jr., Mrs. Robert G. McGann, Mr. Carl Meyer, Mr. Walter P. Murphy, Mr. Stuyvesant Peabody, Mr. Robert H. Ripley, Mr. Charles W. Seabury, Mr. Vaughan C. Spalding, Mr. Eugene M. Stevens, Mr. H. L. Stuart, Mrs. Roger C. Sullivan, Mr. P. C. Ward, and Mr. Philip K. Wrigley.

Mrs. Roger C. Sullivan, it is regretfully recorded, has died since her election.

A list of all classes of Members will be found at the end of this Report.

Vacancies on the Board of Trustees were filled by the election of Mr. Fred W. Sargent, Mr. Samuel Insull, Jr., and Mr. William V. Kelley. Mr. George A. Richardson was elected as a Corporate Member, and at the December meeting of the Board of Trustees he was placed in nomination for a trusteeship, with final action scheduled for the Annual Meeting to be held in January, 1930.

The outstanding addition to the exhibits during the year was the Neanderthal (Mousterian) Man group, installed in Ernest R. Graham Hall of Historical Geology, which was completed and opened to the public on June 8. This life-size group, showing an entire family of Neanderthals and a replica of a cave once actually occupied by these prehistoric people, is the only restoration of its kind in the world. It is a gift to the Museum from Mr. Ernest R. Graham, and is the work of Mr. Frederick Blaschke, sculptor, of Cold Spring-on-Hudson, New York. Research and collecting of material for use in connection with it was performed by the Marshall Field Archaeological Expedition to Western Europe in 1927, under the leadership of Mr. Henry Field, Assistant Curator of Physical Anthropology. The group attracted a tremendous amount of attention, and it is estimated that fully 400,000 Museum visitors have viewed it since it was placed on exhibition. The publicity in connection with it exceeded all precedents, photographs of it and articles about it having appeared in newspapers and magazines all over the world. A complete description of the group will be found in this Report on page 143.

A great many other new exhibits were placed on view during the year. A few of those which are especially interesting are as follows: six additions to the series of large mural paintings of prehistoric animals, presented by Mr. Graham and painted by Mr. Charles R. Knight, bringing the total now on the walls of Graham Hall to sixteen; a habitat group of Indian rhinoceros, the animals being reproduced (by the cellulose-acetate method developed by Taxidermist Leon L. Walters) from specimens obtained by the James Simpson-Roosevelts Asiatic Expedition of 1925-26; a group of Abyssinian dassies composed of specimens obtained by the Field Museum—*Chicago Daily News* Abyssinian Expedition of 1926-27; a model of an oil well; a 341½-carat aquamarine gem presented by Mr. Richard T. Crane, Jr.; a specimen of the peculiar Guatemalan cow-tree presented by the United Fruit Company as a result of a request from

Professor Samuel A. Record, Research Associate in Wood Technology; a number of antiquities from Kish recently obtained by the Field Museum-Oxford University Joint Expedition to Mesopotamia; a selection of the zoological specimens brought home by the Cornelius Crane Pacific Expedition; and a life-size figure representing a Dyak hunter of Borneo.

In addition to the above, four new groups for the Hall of American Mammal Habitat Groups were completed, to be opened to the public early in January, 1930. These consist of a group of polar bear, the specimens for which were presented by Mr. Frederick H. Rawson; a group of Alaska brown bear composed of specimens obtained in 1927 by the John Borden-Field Museum Alaska-Arctic Expedition and the Alexander H. Revell-Field Museum Alaska Expedition; a group of American bison composed of specimens presented by the late Arthur B. Jones, and a group of musk-ox of the Hudson Bay variety (see page 151). The other new exhibits mentioned in the preceding paragraph are all described in detail in the section of this Report devoted to INSTALLATIONS AND RE-ARRANGEMENTS, beginning on page 128.

Much progress was made with reinstallations and improvements in many of the exhibition halls of the Museum, and with relabeling. Especially notable in this respect are the improvements made in Hall J (Egyptian archaeology), Hall 5 (Indians of the Great Plains), Hall D (African ethnology), the Madagascar collection in Hall E, the Arthur B. Jones Malaysian Collection in Hall G, Carl E. Akeley Memorial Hall (African mammals), Hall 21 (systematic bird collections), Hall 25 (plant economics), Charles F. Millsbaugh Hall (North American woods), Hall 34 (minerals, crystals, meteorites, physical geology), Clarence Buckingham Hall (physical geology, rocks, relief maps), and Hall 36 (petroleum, coal, clays, sands).

Including parties engaged in domestic field work, the Museum had seventeen expeditions operating during 1929, and an eighteenth expedition got under way just as the year closed. Thirteen expeditions were at work in overseas territory or foreign waters; four were engaged in work in North America. Full details concerning the personnel, and the work performed, of all the expeditions will be found in the section of this Report under the heading EXPEDITIONS AND RESEARCH, beginning on page 47. The following is a brief summary:

The William V. Kelley-Roosevelts Expedition to Eastern Asia for Field Museum completed its work of more than a year's dura-

tion with the return of the last member in December. The expedition was eminently successful, bringing the Museum a total of 15,397 zoological specimens, 2,400 sheets of botanical specimens, and a few ethnological items. Most remarkable was the success of Colonel Theodore Roosevelt and Mr. Kermit Roosevelt in obtaining near the Tibetan border a complete specimen, including skin, skull and skeleton, of the rare giant panda, the first such specimen ever brought out of Asia. The animal fell before the joint fire of their rifles, and is the first, so far as known, ever shot by a white man. Of the total specimens collected a large proportion was obtained by the second division which worked in French Indo-China under the leadership of Mr. Harold Coolidge, Jr., of Boston. Valuable assistance, which was most helpful and is highly appreciated, was rendered to the expedition by Mr. Jean Theodore Delacour of Seine-Inférieure, France; by His Royal Majesty, the King of Luang-Pro-bang; and by various military and civil officials of the government of French Indo-China.

Likewise eminently successful was the Cornelius Crane Pacific Expedition of Field Museum, the members of which returned in September after nearly ten months of cruising and collecting among the islands of the South Pacific, aboard Mr. Crane's yacht, the *Illyria*. This expedition brought back approximately 18,000 zoological specimens, and also a few ethnological and geological specimens. A new species of rodent was discovered in the Galapagos Islands by this expedition. Mr. Karl P. Schmidt, Assistant Curator of Reptiles, was leader of the scientific party.

The Frederick H. Rawson-Field Museum Ethnological Expedition to West Africa completed its work in Angola (Portuguese West Africa) where extensive and valuable collections were made, and proceeded to Nigeria (British West Africa) where work was to be continued in the early part of 1930. Reports from the leader of the expedition, Mr. W. D. Hambly, Assistant Curator of African Ethnology, indicate that intensive studies were made of many tribes encountered during more than 10,000 miles of travel in Africa. More than 1,200 artifacts were collected in Angola alone; and valuable data, still and motion pictures, and dictaphone records were obtained for ethnological research purposes.

The Chancellor-Stuart-Field Museum Expedition to the South Pacific obtained rare zoological specimens, among them two of the giant lizard of Komodo, Dutch East Indies, and two of the reticulated python of Borneo, largest reptile known to science. The

expedition, sponsored and led by Mr. Philip M. Chancellor of Santa Barbara, California, is concluding its work and is expected home early in 1930. Mr. Norton Stuart, also of Santa Barbara, is co-leader. The Museum is greatly indebted to Mr. Chancellor for the interest in its work which led him to organize this expedition, which was entirely financed by him, and has resulted so splendidly. Mr. Chancellor has also kindly agreed to defray the cost of preparing some of the groups resulting from the expedition.

One division of the Marshall Field Botanical Expedition to the Amazon is continuing work in Peru, where it probably will remain for several months of 1930. The main division, led by Dr. B. E. Dahlgren, Acting Curator of Botany, returned in the autumn of 1929 with several thousand specimens of the native flora of Brazil.

The Field Museum-Oxford University Joint Expedition to Mesopotamia completed its seventh season of excavations on the site of the ancient city of Kish, and will go into its eighth season of work during 1930. Field Museum's participation in this expedition is sponsored by Mr. Marshall Field. Valuable collections and archaeological data of extreme importance resulted from the 1929 work. Professor Stephen Langdon continued as director of the expedition and Mr. L. C. Watelin as field director.

The Harold White-John Coats Abyssinian Expedition of Field Museum, sponsored and led by Captain Harold A. White of New York and Major John Coats of Ayrshire, Scotland, obtained specimens of various animals for a large water hole group, and valuable miscellaneous collections. The water hole group will be one of the largest and finest ever attempted in the Museum, and the institution owe much gratitude to Captain White and Major Coats for their contributions of money, time and work in connection with this expedition. To Negus Tafari Makonnen of Abyssinia, whose hearty cooperation helped vitally to make the expedition a success, the Museum's thanks and appreciation are also due.

The Thorne-Graves-Field Museum Arctic Expedition, sponsored and led by Mr. Bruce Thorne of Chicago and Mr. George Coe Graves II of New York, obtained a number of fine specimens of walrus and of Alaska caribou for proposed habitat groups. Indications are that the walrus specimens will make possible a remarkably lifelike group. This opportunity is taken to express the appreciation of the Museum to Messrs. Thorne and Graves for financing and undertaking this expedition. To them, and also to Mr. Henry Graves,



THE LATE RUSSELL W. HENDEE

A young mammalogist who gave his life for science in French Indo-China
while a member of the William V. Kelley-Roosevelts Expedition
to Eastern Asia for Field Museum

Jr., the Museum is further indebted for a gift of funds to cover the cost of preparing the group.

The Second Marshall Field Archaeological Expedition to British Honduras, led by Mr. J. Eric Thompson, Assistant Curator of Central and South American Archaeology, returned with important collections of Maya artifacts, and much valuable information, resulting from research, which will be used in Museum publications.

The Field Museum-Williamson Undersea Expedition to the Bahamas, working with special equipment for submarine exploration, obtained collections of undersea fauna and data for seven elaborate habitat groups to be constructed in the projected new Hall of Fishes. Mr. J. E. Williamson of New York was leader.

Other expeditions and field work conducted during the year include the researches and photographing of botanical type specimens still in progress in Europe in charge of Mr. J. Francis Macbride of the Department of Botany, under an appropriation received from the Rockefeller Foundation; a botanical expedition in Peru in charge of Dr. August Weberbauer; an ornithological expedition to Arizona; a geological expedition to New Mexico which collected specimens representing the ancient extinct volcanoes of that state, and a zoological expedition in India. The last four were sponsored by Mr. Marshall Field, in addition to the other expeditions already alluded to which were made possible by the funds he provided. The zoological expedition in India was terminated by the unfortunate sudden death of its leader, Colonel J. C. Faunthorpe of Bombay. In addition to the preceding, parties from the Museum conducted paleontological field work in Indiana, and special work for the Department of Zoology in Canada.

The eighteenth expedition to get under way is the Vernay-Lang Kalahari Expedition for Field Museum, which sailed for London on December 27, where final preparations will be made. Departure for Africa is scheduled for early in 1930. This expedition is financed by Mr. Arthur S. Vernay of New York and London, and he will be one of the joint leaders. Associated with him in the leadership will be Mr. Herbert Lang, who is recognized as one of the foremost authorities on African mammals. Other members will be Captain B. E. H. Clifford, Imperial Secretary at Pretoria, Transvaal, British South Africa; Mr. W. Rudyerd Boulton, ornithologist, and Mr. Allan Chapman. A number of rare animals not now represented in the Museum's collections will be sought. One of the chief objectives will be specimens for a group of the beautiful giant sable antelope of

Angola. This opportunity is taken to express the gratitude of the Museum to Mr. Vernay for organizing and conducting this important expedition.

A misfortune befell the William V. Kelley-Roosevelts Expedition to Eastern Asia, in the death of Mr. Russell W. Hendee, young mammalogist of Brooklyn, New York, who was a member of the division which worked in French Indo-China. He died on June 6 at Vientiane, a victim of a tropical fever contracted in the unhealthful interior of that country. His passing was a sad loss not only to his companions but also to Field Museum and all who are interested in zoological exploration. In this field he had won a place which gave promise of unusual accomplishment in the future. Although he had no connection with Field Museum before the expedition started, it had been agreed that he should join its permanent Staff on his return. This agreement had been based upon the reputation he had gained as a student and graduate of the University of Iowa, as a collector of exhibition material in the Arctic for the Colorado Museum, and as a resourceful traveler and collector of scientific material in South America for the British Museum.

The reputation which gained a place for Mr. Hendee on the Kelley-Roosevelts Expedition was more than borne out by his work with the expedition. In a few short months he won the respect and affection of his colleagues to an unusual degree. The amount and the character of the material collected by him, the skill and dexterity evidenced by his preparations, the accuracy of his records, the variety of his interests, and the unselfishness of his devotion to his responsibilities all served to demonstrate that he was a man of rare ability. Skilled and experienced as a naturalist and preparator, possessing abundant energy, having both artistic and literary gifts, educated in science and, withal, having a personal character sympathetic, generous, loyal, and unassuming, he offered that happy combination of qualities needed to make the highest type of museum worker.

The Trustees of the Museum have authorized a pension of \$5,000 to Mr. Hendee's widow, to be paid at the rate of \$1,000 per annum.

Zoological, geological, and anthropological specimens were received by the Museum from the Central Asiatic Expedition of the American Museum of Natural History, in which Field Museum cooperated. Dr. Roy Chapman Andrews led this expedition.

The Museum's operating deficit for the year 1929 was \$108,274.25. During the year the Museum was the recipient of many benefactions,

and it is fitting here to renew the expression of thanks to all who have made contributions in money and material.

Acknowledgments of contributions of funds follow herewith:

Mr. Frederick H. Rawson made gifts totaling \$20,000. One of \$10,000 was for the purpose of conducting an expedition to Angola and Nigeria, West Africa, to collect ethnological material and make ethnological studies among the natives, and the other, also of \$10,000, is to be devoted toward the expense of preparing and installing the proposed Hall of Prehistoric Man which will contain several large groups and various related collections.

Mr. Samuel Insull also made a gift of \$10,000 towards the fund being accumulated for the proposed Hall of Prehistoric Man.

Mr. Silas H. Strawn contributed the sum of \$5,000, which amount has likewise been added to the fund for this hall.

Mr. William J. Chalmers contributed \$521 for the purchase of thirty-four specimens of minerals for the William J. Chalmers Crystal Collection.

The late Mrs. Julius Rosenwald contributed, before her death, the sum of \$50,000. Mrs. Rosenwald placed no restriction upon this gift, which has been designated as "The Mrs. Julius Rosenwald Fund," the income from which will be used for such purposes as the Board of Trustees may approve.

Mrs. James Nelson Raymond made a further contribution of \$3,000 towards the operating expenses of the James Nelson and Anna Louise Raymond Public School and Children's Lecture Division.

Mr. Marshall Field contributed \$165,567 during the year. Of this amount \$100,000 represents his annual gift to the Museum, and \$65,567 was given to pay part of the operating deficit of the Museum. Mr. Field also arranged to add \$100,000 to his annual contribution for the year 1930 in order to take care of the anticipated deficit for that year, which will make his total contribution \$200,000 for 1930.

President Stanley Field contributed a total of \$110,079.50. This amount was given in four different contributions: one of \$52,844.75 was made towards the liquidation of the building fund deficit; one of \$20,000 and another of \$22,707.25 were made to cover part of the operating deficit of the Museum for the year 1929; and the fourth contribution, amounting to \$14,527.50, was to cover the operating

expenses of the Stanley Field Plant Reproduction Laboratories during 1929.

"A Friend of the Museum" contributed \$12,500 for the Field Museum-Williamson Undersea Expedition to the Bahamas, to collect undersea material for marine life groups; to make photographs, sketches, and color notes, and to procure other data for portraying undersea scenes and life. This expedition was in operation during the spring and summer.

Mr. Richard T. Crane, Jr., made a further contribution of \$2,783 for the purchase of gem specimens for H. N. Higinbotham Hall.

The American Friends of China made a further contribution of \$577.50, representing one-half of the dues received by the society during the year 1929.

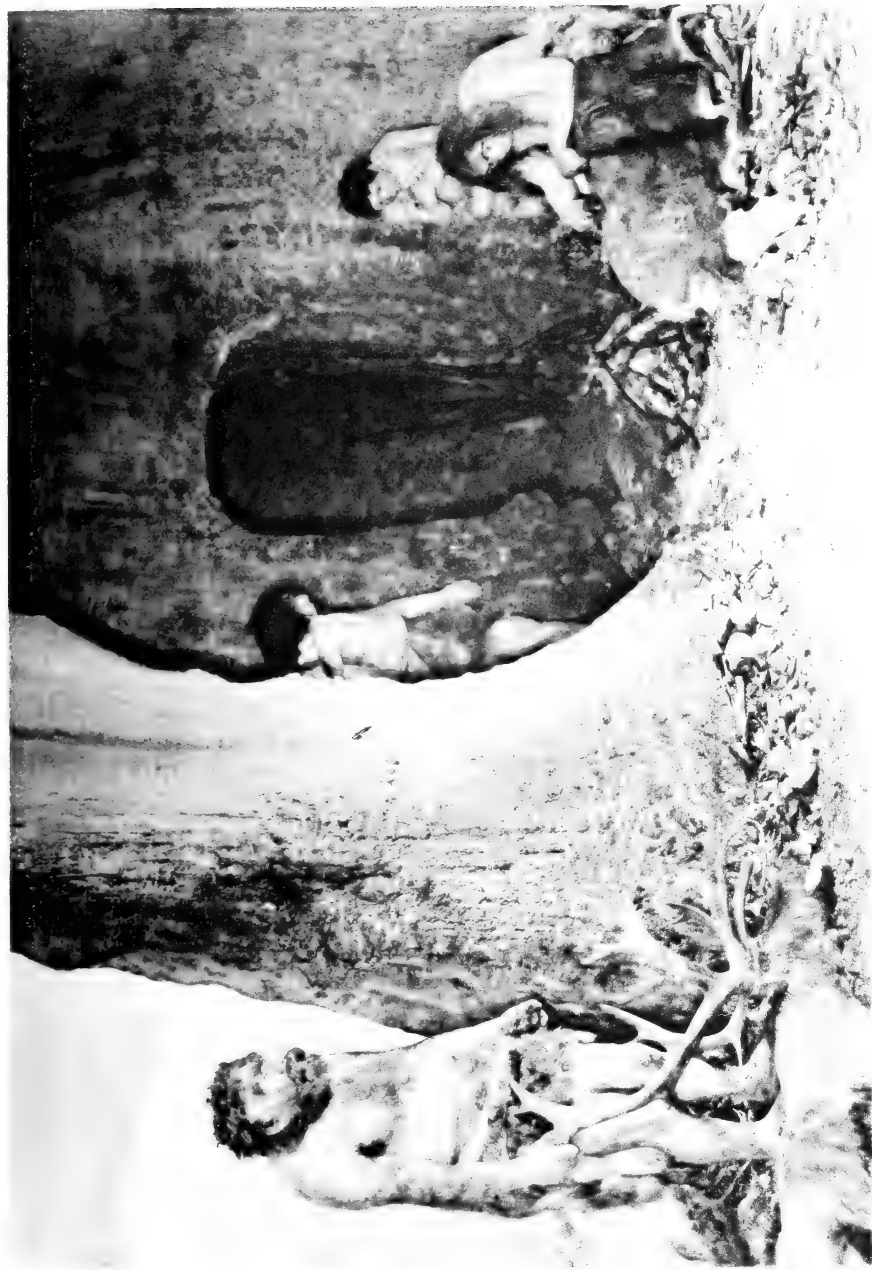
Mr. Martin G. Schwab made a gift of \$300 to be used towards the purchase of an imperial ceremonial silk robe from China.

The late Mr. Chauncey Keep provided in his will a legacy of \$50,000 for Field Museum.

The late Katherine L. Andrin provided in her will a legacy of \$5,000 for the Museum.

The merits of a plan by which Field Museum would make photographs of more or less inaccessible type specimens of tropical and South American plants in foreign herbaria, and distribute copies of such photographs to herbaria of other institutions, were recognized, and the plan was endorsed by leading botanists. The project was then laid before the Rockefeller Foundation which generously appropriated \$15,000 to cover the expenses of carrying it out during 1929, 1930 and 1931, a contribution for which the Museum is deeply grateful. Under the provisions of this fund Assistant Curator J. Francis Macbride was sent to Berlin to make photographs of the many types of South American plants which are in the collections of the Botanical Garden and Museum of Berlin. Most encouraging reports as to the success of this work have been received from him. In connection with the same project, Dr. B. E. Dahlgren, Acting Curator of Botany, while in Brazil as leader of the Marshall Field Botanical Expedition to the Amazon, took the opportunity for making a large number of photographs of type specimens in institutions of that country.

The South Park Commissioners turned over to the Museum \$222,220.52, representing the amount due the Museum under the tax levy authorized for this purpose by the state legislature. Of



RESTORATION OF A FAMILY GROUP OF NEANDERTHAL MAN

Ernest R. Graham Hall

Gift of Ernest R. Graham. Frederick Blaschke, Sculptor

this amount, \$72,220.52 was in cash payments made in the usual way by the Commissioners, and the balance of \$150,000 was from the sale of tax anticipation warrants upon which the Museum will pay the interest until the warrants have been redeemed by actual tax payments.

As has been the case every year since the Museum was founded, many friends of the institution have generously contributed material for the collections of the various Departments. Such gifts are deeply appreciated, as they help to make it possible for the Museum to expand its usefulness, and they indicate the constant active interest taken in the institution by its friends. Among outstanding gifts of this kind received during 1929 were two unique mortuary Chinese clay figures of horsewomen engaged in playing polo, presented by Mr. Earle H. Reynolds of Chicago; three rare Chinese carvings presented by Dr. I. W. Drummond of New York; a Japanese wooden saddle, elegantly lacquered, given by Colonel A. A. Sprague; two bird paintings by the artist Fuertes, also presented by Colonel Sprague; three valuable specimens of cut gems presented by Mr. Richard T. Crane, Jr.; thirty-four specimens of crystals presented by Mr. William J. Chalmers for addition to the collection of crystals to which he has contributed year after year; forty-nine specimens of gems presented by Mrs. Joseph W. Work of Evanston, Illinois; important paleontological collections from Mr. and Mrs. William and Toodie Bower and Mr. Franklin Bower of Argos, Indiana, from Former Judge George Bedford of Morris, Illinois, and from Mr. Henry Gebauer of Chicago; specimens of a stoat and a wildcat presented by Lord Astor of London; a sea-elephant skeleton given by Hagenbeck Brothers of Stellingen, Germany; two specimens of a very rare lizard from the Kalahari Desert presented by Dr. W. J. Cameron of Chicago; and a collection of old California Indian baskets, presented by Mr. Homer E. Sargent of Pasadena, California.

In addition to the above, noteworthy collections and specimens for the various Departments were received as gifts from many other individuals and institutions, among whom are the following: Mr. Herbert J. Devine, New York; Mr. Julian Armstrong, Chicago; Mrs. John Alden Carpenter, Chicago; Mr. H. W. Seton-Karr, London; Oxford University; Mr. H. C. Benke, Chicago; the Garfield Park Conservatory; Yale University; Purdue University; Illinois State Museum; Chicago, Milwaukee, St. Paul and Pacific Railroad; Standard Oil Company (Indiana); Mr. F. J. W. Schmidt, Stanley, Wisconsin; Mr. Frederick H. Rawson, Chicago; the General Bio-

logical Supply House, Chicago; Mr. E. B. Williamson, Bluffton, Indiana; Dr. A. R. Emerson, Chicago; Mr. and Mrs. S. Yamagata, Chicago; Ichabod T. Williams and Sons, New York; the F. B. Williams Cypress Company, Patterson, Louisiana; the Pickrel Walnut Company, St. Louis; the Panhandle Lumber Company, Spirit Lake, Idaho; the American Walnut Manufacturers' Association Chicago, and the All-American Mohawk Radio Corporation, Chicago. These are but a few of the many contributors. A complete list of them and their gifts appears in the LIST OF ACCESSIONS beginning on page 170, and detailed descriptions of the various gifts appear in the section of this Report under the heading ACCESSIONS, beginning on page 93.

By bequest the Museum received the important private herbarium of the late Robert Ridgway, of Olney, Illinois. Consisting of some 4,000 specimens, this collection is a valuable addition to the Museum's Illinois Herbarium.

In addition to gifts and bequests, the Museum, as usual, added extensively to its collections through exchanges with other institutions, and through purchases. Details of such acquisitions will also be found in the section of this Report dealing with ACCESSIONS (page 93) and they are listed in the LIST OF ACCESSIONS (page 170).

The plans for the Hall of Prehistoric Man, material for which was collected by Assistant Curator Henry Field in Europe in 1927 (see Annual Report for 1928, pages 423-425), were perfected, and a contract for the life-size groups has been made with Mr. Frederick Blaschke, the sculptor who accompanied Mr. Field on his expedition to Europe. Mr. Blaschke is now at work on the groups in his studio at Cold Spring-on-Hudson, New York. The object of this hall is to illustrate the development of prehistoric man of western Europe from earliest geologic times down to about 10,000 B.C. The hall will contain nine life-size groups, and seven cases devoted to casts of human remains and the contemporary fauna, as well as artifacts made by prehistoric man in flint and bone.

During the summer, the Director, accompanied by Mr. Joseph N. Field, son of President Stanley Field, made a trip to all the principal countries of Europe, visiting the important museums for purposes of studying their methods, and for effecting contacts that would result in wider exchange relations between them and Field Museum.

Towards the end of the year plans were completed for the publication by the Museum of a small monthly bulletin for Members, to be known as *Field Museum News*. Preparations were made

to issue the first number in January, 1930. By this means it is believed the membership will be kept in constant closer touch with the activities of the Museum. The Director will be editor; the Curators will be contributing editors, and the managing editor will be Mr. H. B. Harte of the Division of Public Relations. The bulletin will be printed by the Museum's Division of Printing.

An unprecedented number of publications was issued by the Museum during 1929, the speeding up of this work being made possible by the employment of seven additional printers, and operating the Museum's printing plant on both day and night shifts.

It is pleasing to record that Dr. Charles E. Hellmayr, Associate Curator of Birds, was awarded the Brewster Medal of the American Ornithologists' Union for his work in the continuation of the late Charles B. Cory's *Birds of the Americas* and for his list, *Birds of Northeastern Brazil*.

Professor Roy L. Moodie of Santa Monica, California, was authorized by the Museum to prepare a study of the mummified animals of Egypt in Field Museum, for publication as an appendix to his general report on the Museum's mummies. This work is based on research conducted by means of the Museum's X-ray equipment, presented several years ago by President Stanley Field.

An important contact with the public was made through a series of fourteen radio broadcastings about the Museum and its activities, given, one a week, by the Director, the Curators and other members of the scientific staff over the *Prairie Farmer* station, WLS, in cooperation with the *Chicago Daily Journal*.

Groups of students heard lectures on prehistoric life by Mr. Elmer S. Riggs, Associate Curator of Paleontology, some of these being given in the exhibition halls, and some outside the Museum.

Associate Curator of Geology Henry W. Nichols gave a brief lecture on local geology before the local section of the American Institute of Mining Engineers.

Satisfactory progress has been made in the work of all Departments and Divisions of the Museum during the year. All such activities as enlargement of collections, installations of new exhibits, reinstallations and improvements of older exhibits, improvement and enlargement of study collections and facilities, cataloguing, inventorying and labeling, scientific research into various subjects, and general public service in answering inquiries which come in on

various subjects within the scope of the Museum, have been performed on a large scale. Details of all such work appear elsewhere in this Report.

The educational activities of the Museum were conducted with gratifying success. The usual spring and autumn courses of free illustrated lectures on science and travel by eminent explorers and scientists were given for the general public in the James Simpson Theatre of the Museum, and also a series of special lectures for Members. These were well attended, as shown in a subsequent section of this Report (page 32).

The Department of the N. W. Harris Public School Extension continued its work of circulating traveling cases containing natural history and economic exhibits among the schools of Chicago. As has been the case each year since this Department was organized, the number of cases in use and the number of schools and other centers served have been increased to a noteworthy degree (see page 155).

The James Nelson and Anna Louise Raymond Public School and Children's Lecture Division of the Museum conducted its various activities with the same gratifying response on the part of children, school authorities and teachers, which they have been accorded in other years. These activities include the sending of extension lecturers with lantern slides to the schools; the presentation of series of free motion picture and other educational entertainments for children in the James Simpson Theatre during the spring, summer and autumn; conducting of tours of the exhibits for groups of children, and other activities treated at length in another section of this Report devoted particularly to this Division (page 34).

The guide-lecture tours for adults conducted twice daily, except on Saturdays and Sundays, were continued throughout the year with notable success in the number of persons participating and the wide variety of subjects covered. As in the past special service of this type for groups requesting it, as well as the regular public service, was made available.

The Library of the Museum has seen an expansion in the collections of important and valuable reference works on its shelves, and its services both to the Staff of the Museum and to the general public have continued to be fruitful (see page 45).

Much important work has been accomplished in such Divisions of the Museum as Public Relations, Printing, Photography, Roent-

genology, Illustration and Memberships. Detailed accounts of the work of all these, as well as of the previously mentioned Departments and Divisions, will be found in various other sections of this Report.

In the death of Mr. Chauncey Keep, a member of the Board of Trustees, on August 12, 1929, the Museum suffered a serious loss. Mr. Keep had been a Trustee since 1915. He was also an Honorary Member, a Corporate Member and a Life Member. In tribute to his memory the Board of Trustees adopted the following resolution on September 16:

"The Board of Trustees of Field Museum of Natural History pauses to do homage to the memory of Mr. Chauncey Keep, whose death on August 12, 1929, at the age of seventy-six years, removed from its membership one whose valuable and memorable service had made him an outstanding character in the industrial and financial life of Chicago.

"Mr. Keep became a member of the Board in 1915 and served as a member of the Finance Committee. Thus for the past fourteen years he has been intimately associated with the development of the Museum. Possessed of a clear and comprehensive intellect, his counsel and aid were of incalculable service to this institution.

"Mr. Keep had a charm and a kindly manner, as well as a vigorous personality, which endeared him to all with whom he came in contact. His interest in the welfare and mission of Field Museum of Natural History was manifested not only by his labors for it, which continued during his long illness, but by generous gifts to it during his life and by a bequest of \$50,000 at the time of his death.

"Therefore, be it resolved that this expression of our admiration and esteem for Mr. Keep, and our grief at his passing and the loss of his counsel and companionship be preserved on the permanent records of the Board.

"And be it further resolved that our deep sympathy be conveyed to the members of his family in their bereavement and that a copy of this resolution be sent to his widow."

There were a number of changes in the Museum Staff during the year by resignations and new appointments. Also, creation of a number of new positions made necessary a number of additions to the personnel.

Dr. William D. Strong resigned his post as Assistant Curator of North American Ethnology and Archaeology. Dr. Paul S. Martin,

formerly of the staff of the Public Museum, Milwaukee, and the Colorado State Museum, Denver, was appointed Assistant Curator of North American Archaeology.

Mr. Walter A. Weber, who accompanied the Cornelius Crane Pacific Expedition as artist and ornithologist, upon his return was appointed as Artist and Assistant in the Department of Zoology. Mr. Dwight Davis was appointed as an Assistant in Osteology.

Mrs. Margaret F. Pyatt, Chief of the Raymond Division Staff, resigned, and Miss Margaret M. Cornell, her senior assistant, was promoted to fill the position. Miss Miriam Wood and Mr. Gordon S. Pearsall are new guide-lecturers appointed during the year. Miss Mary Louise Smith was also appointed as a guide-lecturer, but resigned shortly, due to ill health. Mr. Alfred L. Hertel, guide-lecturer, severed his connection with the Museum.

Mr. Douglas W. Gibson, purchasing agent, resigned, and his place was filled by the appointment of Mr. J. L. Jones.

Mr. Lorenz Risili was employed for work in the Stanley Field Plant Reproduction Laboratories, and Mr. Philip C. Orr and Mr. Sven Dorf were employed as preparators in vertebrate paleontology.

Mr. Thurston Wright, assistant bird taxidermist, resigned, and his place was filled by the appointment of Mr. John W. Moyer. Mr. Klaus Abegg was employed as a taxidermist's assistant.

In the Division of Printing, a proofreader, a pressman, a makeup man, compositors, and one bindery girl were added to the working force. This increased personnel has made possible more efficient work, and has enabled publications and exhibition labels to be printed which had previously been delayed because of insufficient help.

Mr. G. S. Wittrock was given a temporary appointment to perform the work of the Custodian of the Herbarium during the absence, due to ill health, of the regular Custodian, Mr. Carl Neuberth.

Volunteer services without pay were rendered in the Department of Zoology by Mr. Daniel Clark and Mr. G. C. Hixon.

The title of Mr. Clifford C. Gregg was changed from General Assistant to Assistant to the Director.

Second Sergeant of the Guards Charles Kuhn was placed on the Museum's pension payroll, following his retirement from active duty after nearly thirty-six years' service.

Following the death of Mr. Joseph Schmitz, monotype operator in the Division of Printing, the sum of \$3,000, representing insurance under the Museum Pension Fund, was paid to his widow.

The newspapers, as in past years, have accorded the Museum wholehearted cooperation in its publicity campaign carried on for the information of the public and to attract visitors to the institution. Not only the press of Chicago, but newspapers and press associations all over the country have devoted more space to Museum activities than ever before. Outstanding news and photographs from the Museum were given international circulation also.

As in the past the Museum has been fortunate in having various powerful advertising media opened to it without charge. It has been advertised in posters displayed by local transportation companies, by using space given in theatre and opera programs, and by the distribution of Museum direction folders by railroads and other transportation companies, hotels, civic associations, and other organizations.

Grateful acknowledgment is hereby extended to those in charge of the various enterprises which have thus given generous assistance in promoting public interest in the Museum. The details of advertising and publicity are to be found in this Report under the heading DIVISION OF PUBLIC RELATIONS (page 157).

Much of the material comprising the transportation exhibits, formerly shown in Field Museum when it was located in Jackson Park, was this year turned over to the new Museum of Science and Industry, founded by Julius Rosenwald. This material had never been exhibited in the present building, due to the limitation of Field Museum's scope to the natural sciences. Practically all of the transportation material is involved in the transfer to the Museum of Science and Industry. It will form the nucleus of an instructive and interesting exhibit in the new museum, and its removal from Field Museum has made available a large amount of additional space excellently adaptable for exhibition purposes.

A large number of publications, which are duplicates of ones on the shelves of Field Museum's Library, or are for other reasons no longer useful to this Museum, were distributed to other institutions to which they would prove valuable. Among such institutions are the Museum of Science and Industry, the Shedd Aquarium, and the University of Chicago. Still other such material was redistributed to the institutions from which it was originally obtained.

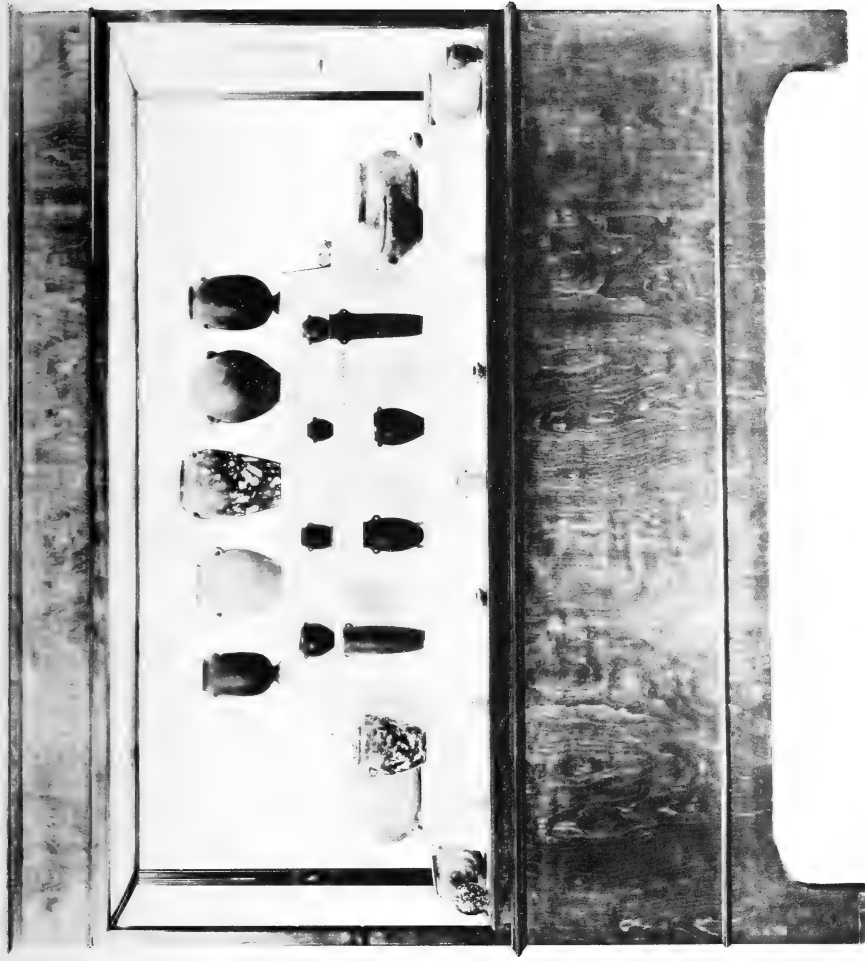
Early in the year it was decided to insure the Museum building against fire, and its contents against loss or damage by fire, water or theft. The insurance firm of Marsh and McLennan was employed

to inspect the premises and make recommendations. In order to obtain the lowest possible rate of insurance the Museum carried out certain recommendations made by the engineers of that firm after they had completed a most thorough examination of the building, and had made a study of the institution's operating requirements and the practices involved in carrying them on. These recommendations were followed at a total expense of \$7,433.06, and the Museum agreed to replace gradually all wooden shelving and cabinets of wood with others of fireproof materials. A thorough house cleaning of accumulated hazardous material was made. There were installed in various parts of the building forty-four watchmen's patrol service stations, a fire alarm system consisting of fifteen stations, two annunciator gongs, forty-five chemical fire extinguishers, and sprinkler systems for the pressroom of the Division of Printing, and for the paint and carpenter shops. Fireproof doors with approved closures were installed in the pressroom, paint, carpenter and electrician's shops. A fireproof partition with approved gravity sliding door was built around the woodworking machinery in Room 38 (workshop of Department of Anthropology) on the third floor. A vault for storing supplies of a hazardous nature used in taxidermy was built on the fourth floor. A total of approximately 7,800 feet of fire hose was purchased and connected with fifty-three risers.

Insurance for \$5,000,000 on the building, and \$2,500,000 on its contents, was placed. While it is impossible to determine the actual value of the contents, an estimate of \$50,000,000 would not seem too high. The actual value of the building would be approximately \$7,000,000. However, the amount of insurance placed seems to be adequate to assure a proper measure of protection against what seems the most likely maximum of hazard.

Maintenance and improvement in the Museum received their proper attention during the year. The growing needs of the institution, requiring, as they do, frequent extensive improvements and additions to keep pace with the increasing demands of the Departments, are an indicator of the rapid and constant development of the Museum. More and more each year the Museum is becoming better equipped to perform all of its necessary labor, including not only that for technical and scientific purposes, but that for ordinary maintenance work as well.

Among the improvements may be mentioned the construction of six built-in cases in Ernest R. Graham Hall of Historical Geology. These were built to house the following groups: Neanderthal Man



NEW TYPE OF CASE WITH INDIRECT LIGHTING

Used in Hall J (Archaeology of Egypt). The exhibits in this case are Egyptian stone vessels, predynastic and of the Middle Kingdom (3500-1800 B.C.)

(already installed), Titanotheres, Meshippus, restoration of a Carboniferous forest, Cambrian sea life, and Ordovician sea life.

Construction of a case 43' 6" wide, 21' 11" deep and 22' high was nearly completed at the south end of Carl E. Akeley Memorial Hall. This case will be devoted to the group of African animals at a water hole to be prepared from specimens obtained by the Harold White-John Coats Abyssinian Expedition.

Nineteen large cases and three small ones in Akeley Hall, containing African mammal habitat groups, were remodeled and fitted with back panels of light color, and with transoms and illuminating hoods for individual lighting. These cases were regrouped and backed to the walls, thus creating a much wider central aisle in the hall.

By remodeling twelve A-shaped cases in Albert W. Harris Hall to a uniform height and fitting new tops to them, provision was made for a very satisfactory installation of reptiles.

Thirty-seven floor cases have been provided for the reinstallation of certain Egyptological material in Hall J. Of these, twenty-one are remodeled old cases, and the balance new. Each is equipped with a specially designed top for individual lighting.

An individually lighted wall case more than twenty-five feet long, about four feet high, and one foot deep was made in the Museum shops for installation of the Egyptian papyri.

Two cases, one for reinstallation of the reproduction of a pineapple plant and the other for exhibiting a fruit cluster of the sago palm, were purchased.

A case, 108 feet long and two and one-half feet deep, was built and installed on the south wall of Hall J (Egyptian archaeology). It will be used for the exhibition of Coptic textiles. Illumination is provided within the case, but entirely outside the range of vision.

The case, which for many years has contained a large ancient Egyptian boat, was remodeled and furnished with means for lighting its interior.

Special lights were installed for stair lighting at the west entrance leading to the James Simpson Theatre.

Following out the line of improvement begun a little more than a year ago of constructing steel and plaster partitions between the zoological exhibition halls, there were thirty-eight such partitions built between Halls 17, 18, 19 and 20.

Insulating panels were installed in windows of Halls 3, 15, 27 and 30, and the draperies which covered those windows were permanently removed.

All of the twenty-four windows and ninety-six transoms in the bridge corridors connecting exhibition halls on the second floor were bricked up and plastered. These bridges are now available as additional and desirable exhibition areas.

A program of painting the exhibition halls was begun. Fourteen halls, Nos. 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 21, 22, 30 and C, were done. In addition, eleven departmental offices and workrooms, the President's reception room, and the Director's and Auditor's three-room suites of offices were painted. The outside of all windows and the inside of windows on the fourth floor were painted. Many other painting jobs of smaller magnitude but of much importance were also done.

The rope guard around the elephant group in Stanley Field Hall, which had proved unsatisfactory, was removed, and in its place was built a wooden base finished with naturized rubber flooring.

The Frank W. Gunsaulus Japanese Collections, which formerly occupied Hall 30, were removed to a new location recently made available in the west half of Hall C on the ground floor. In this place it was possible to arrange the exhibition cases to better advantage than in the former location. The name, Frank W. Gunsaulus Hall, has been transferred from the old hall to the new one.

The two rooms which had formed Hall 30 were made into one large room by the removal of the partition which separated them. Two large openings, architecturally treated to conform with the entrances to adjacent halls, were made. The hall will be devoted to the exhibition of Chinese jade objects representing all periods. Eight walnut cases, each with an illuminating hood, were purchased for the installation of the jade collections.

Provision for the better display of the Museum's post cards, publications and photographs was made by the construction of two wooden stands with display racks in the northeast and northwest corners of Stanley Field Hall near the main entrance. These stands are of cabinet workmanship and designed in keeping with the character of the exhibition cases of the hall.

Foreseeing the future need for additional exhibition space on the main floor, there was cleared for this purpose Hall 12, which had

been occupied for some years as a classroom by the Art Research Classes conducted in cooperation with the Art Institute of Chicago. In its place, quarters were provided for these classes in the west portion of Hall B on the ground floor. The classes have found the new quarters more suitable for their purposes than the old ones.

Better and increased storage facilities were added to the Departments of Anthropology, Botany, Geology and Zoology.

An unused portion of the transformer room was converted into a storeroom for North and South American archaeological material. It has a floor area of 1,225 square feet, and is fitted with 4,545 square feet of adjustable metal shelving.

The Department of Botany was provided with three blocks of steel herbarium cases, each 9' 2" x 3' 5" x 7' 3". Each block consists of eight compartments with thirty-two pigeonholes to each compartment.

To insure systematic and safe storage of paleontological material awaiting preparation for exhibition or study purposes, twenty-five steel cabinets, each fitted with a metal shelf and two drawers on roller bearings, were provided. These cabinets have a total capacity of 1,000 cubic feet.

The Department of Zoology was supplied with increased storage facilities for birds and mammals by the addition of thirty-two large steel storage cabinets having a total of 1,380 trays. Storage accommodations for all mammal bones now in the Department of Zoology, and for all it is likely to acquire over a long period of time, have been erected along the west passage of the fourth floor. For this purpose forty-eight steel cabinets—each 5' x 4' x 6' 8", with steel shelves and drawers on roller bearings, and with a door in front and back of each cabinet—were installed. The doors close in on thick moth-proof felt.

A fur storage vault consisting of three gas-tight, mechanically ventilated, fireproof rooms, with a floor area of 1,650 square feet, was built on a mezzanine occupying the full width of the north end of the taxidermists' shop on the fourth floor. Under the west end of this fur storage space, and on a level with the floor of the taxidermists' shop, there has been built a soundproof and non-vibrating room with a floor area of 350 square feet to accommodate machines for dressing and cleaning furs. The centralization of these requisites in the Museum's main taxidermy shop will greatly increase efficiency. All wooden shelving and cabinets in the taxidermy shop were replaced with steel ones.

Near the boiler-room there was built a fireproof macerating and degreasing room with three gas-fired tanks. With this greatly needed addition it now will be possible for the Division of Osteology to take care of the present large and steadily increasing number of skulls and other skeletal material.

On the first and ground floors of the Museum 300-watt glassteel lighting fixtures to the number of 349 were installed, in Halls 2, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 18, 21, B and C. Approximately 100 exhibition cases, in Halls 16, 22, 30, 36, 38, D and J, were wired and equipped for lighting.

Tuck pointing was carried on during 1929 along all of the north side of the Museum building, with the exception of one very small area; along all of the west side except for a small part which had been done previously; and on the southwest corner of the central pavilion. Approximately one-half of the walls of the building now remains to be tuck pointed.

The coal conveyor was overhauled and put in good condition. Brickwork on the boilers was repaired, and fourteen tubes were replaced in two of the boilers. Steam for heating was furnished to the Shedd Aquarium from December 27, 1928, to March 22, 1929, and again from October 11, 1929, to the end of the year and continuing into 1930. Steam was furnished to the building on Soldier Field from November 21 to 27, 1929.

LECTURES AND ENTERTAINMENTS

GENERAL LECTURES.—The Museum's fifty-first and fifty-second courses of free lectures for the public were given in the James Simpson Theatre on Saturday afternoons during the spring and autumn months. They were illustrated by motion pictures and stereopticon slides. Following are the programs of both courses:

FIFTY-FIRST FREE LECTURE COURSE

- February 23—Four Years at the Courts of the Sultans of Java.
Mr. Tassilo Adam, ethnologist of the Dutch East Indies.
- March 2—From Cairo to the Cape.
Captain Carl von Hoffman, F.R.G.S., New York.
- March 9—Man-hunting in the Jungle.
Commander George M. Dyott, F.R.G.S., New York.
- March 16—Camera-hunting on the Continental Divide.
Mr. William L. Finley, American Nature Association.
- March 23—Prehistoric Man in America.
Mr. Barnum Brown, American Museum of Natural History.

- March 30—Bryce, Zion and the Grand Canyons.
(Illustrated with Lumiere Autochrome plates.)
Dr. C. C. Schneider, member of the Sierra Club.
- April 6—Bali—The Garden of the Gods.
Mr. André Roosevelt, New York.
- April 13—Recent Explorations in Time and Space.
Professor Forest Ray Moulton, astronomer, Chicago.
- April 20—In the Cellars of the World.
Mr. Russell T. Neville, cave explorer, Kewanee, Illinois.
- April 27—Indian Winter in the Labrador.
Dr. William Duncan Strong, anthropologist of the Rawson-MacMillan Subarctic Expedition for Field Museum.

FIFTY-SECOND FREE LECTURE COURSE

- October 5—Formosa—The Island Beautiful.
Mr. Clarence Griffin, London.
- October 12—Man's Place in Geologic History.
Dr. Oliver C. Farrington, Curator of Geology, Field Museum of Natural History.
- October 19—Wild Flowers and Trees.
Mr. Guy C. Caldwell, American Nature Association.
- October 26—Earth and Neighbor Worlds.
Dr. Clyde Fisher, American Museum of Natural History.
- November 2—Lands of the Sun.
Mr. Frederick Monsen, Pasadena, California.
- November 9—Zulu Tribe.
Captain Carl von Hoffman, F.R.G.S., New York.
- November 16—Bird Islands of Peru.
Dr. Robert Cushman Murphy, American Museum of Natural History.
- November 23—Explorations and Excavations at Chichen-Itzá, Yucatan, and Uaxactun, Guatemala.
Dr. Sylvanus G. Morley, Carnegie Institution, Washington, D.C.
- November 30—Through Southern Abyssinia.
Mr. C. J. Albrecht, Department of Zoology, Field Museum of Natural History, member of the Harold White-John Coats Abyssinian Expedition of Field Museum.
- December 7—Along the Floor of the Ocean for Field Museum.
Mr. J. E. Williamson, leader of the Field Museum-Williamson Undersea Expedition to the Bahamas.

The total attendance at these twenty lectures was 26,199.

In addition to the regular spring and autumn courses, the following special lectures were given for Members of Field Museum:

- January 13—Beauty and Tragedy under the Sea.
Mr. J. E. Williamson, New York.
- November 3—Lands of the Sun.
Mr. Frederick Monsen, Pasadena, California.
- November 10—Zulu Tribe.
Captain Carl von Hoffman, F.R.G.S., New York.

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November 17—Bird Islands of Peru.

Dr. Robert Cushman Murphy, American Museum of Natural History.

November 24—Explorations and Excavations at Chichen-Itzá, Yucatan, and Uaxactun, Guatemala.

Dr. Sylvanus G. Morley, Carnegie Institution, Washington, D.C.

December 1—Trailing the Giant Panda on the Chinese-Tibetan Frontier.

Mr. Kermit Roosevelt and Mr. C. Suydam Cutting, New York, members of the William V. Kelley-Roosevelts Expedition to Eastern Asia for Field Museum.

December 8—Along the Floor of the Ocean for Field Museum.

Mr. J. E. Williamson, New York, leader of the Field Museum-Williamson Undersea Expedition to the Bahamas.

December 15—The Kingdom of the Million Elephants and the White Parasol.

(A remote province of Indo-China where pioneer scientific work was done by members of the William V. Kelley-Roosevelts Expedition for Field Museum, and where a distinguished mammalogist gave his life for the cause of science.)

Mr. Harold J. Coolidge, Jr., F.R.G.S., Boston, leader of the Indo-China division of the expedition.

The total attendance at these eight special lectures was 7,384.

The total number of lectures for adults was twenty-eight, and the total attendance at them was 33,583.

JAMES NELSON AND ANNA LOUISE RAYMOND PUBLIC SCHOOL AND CHILDREN'S LECTURE DIVISION

ENTERTAINMENTS FOR CHILDREN.—The James Nelson and Anna Louise Raymond Public School and Children's Lecture Fund made possible the continuation of lecture and entertainment work among children, both in the Museum and outside in schools and camps.

Series of entertainments on Saturdays were offered as usual in the spring and autumn months, and a summer series on Thursdays was given during July and August. Following are the programs of these three series of entertainments:

SPRING COURSE

February 23—Pieces of China.

March 2—The Delta of the Nile.*

In and about Cairo.*

A Trip down the Nile.*

The Cabbage Butterfly.

Brooding Chickens.

March 9—Romance of Rubber.

Our Dog Friends.

Yosemite's New Roads.

Quaint People and Queer Places.

March 16—Rome, the Eternal City.*

Naples and Vesuvius.*

The Buried City.*

Our Animals and How They Help Us.

- March 23—Story of Our National Parks.
Earthquakes.
Birds of Prey.
Felling Forest Giants.
- March 30—King Alfonso's Busy Day.*
Gibraltar.*
Ronda and Granada.*
Invading "Musky" Land.
Tigers of the North.
- April 6—Familiar Foods from Foreign Lands.
The Great White North.
- April 13—Scottish Tidbits.*
Emerald Isle.*
White-tail Deer in the Adirondacks.
The Horse and Man.
National Bird Refuges.
- April 20—Arctic and Tropic Houses.
Arctic and Tropic Boats and Fishermen.
Wild Flowers.
- April 27—Where Salmon Leap.
A Cruise to the Land of the Midnight Sun.
(By courtesy of the Norwegian America Steamship Line.)

*In cooperation with "Topsy Turvy Times" department of the *Chicago Daily News*, which broadcast a "Trip around the World" from WMAQ radio station.

The total attendance at these ten entertainments was 13,505.

AUTUMN COURSE

- October 5—Sea Birds.
Seals.
Little People of the Sea.
The International Ice Patrol.
- October 12—Columbus.*
Philadelphia.
- October 19—The Panama Canal.
Pillars of Salt.
Some Wild Babies.
The Spider.
The Ant-lion.
- October 26—Illustrated talk, "Earth and Neighbor Worlds."
Dr. Clyde Fisher, American Museum of Natural History.
She's Wild.
From "Paddy" to Bowl.
In a Drop of Water.
- November 2—The Story of Steel.
- November 9—Nesting of the Sea Turtle.
The Cruise of the Princess Pat.
- November 16—Our Chicago.
Story of the Four Seasons.
- November 23—Beautiful Catalina.
The Cliff Dwellers.
Berber Mountain Peoples.

November 30—King Snow Holds Court.
Roads to Wonderland.
The Pilgrims.*

December 7—Illustrated talk, "Giants of Long Ago."
*Chauncey Keep gift to Field Museum.

The total attendance for the autumn course of entertainments was 18,554. The total attendance for the spring and autumn course together was 32,059.

To help meet the needs of the children for wholesome entertainments during the summer months, a series consisting of tours of the exhibits, and motion pictures and story hours in the James Simpson Theatre, was presented, as follows:

SUMMER PROGRAMS

- J u l y** 11—Tour—Indians of Plateau and Desert.
Motion Pictures:
Aboriginal Inhabitants.
The Petrified Forest.
Irrigation in the Southwest.
The Eagle's Nest.
Pagan People in the Painted Desert.
- J u l y** 18—Story Hour—"Ptahhotep, the Egyptian Boy."
(Illustrated with colored pictures.)
Tour—The Egyptian Hall.
- J u l y** 25—Tour—A Trip to Java, Borneo and Sumatra.
Motion Pictures:
Strange Prayers.
Maizok of the South Seas.
- A u g u s t** 1—Tour—South American Plants and Animals.
Motion Pictures:
The Zoo.
Buenos Aires.
Parana.
Falls of Iguassu.
Monkey Land.
- A u g u s t** 8—Story Hour—"Mistanapish Visits His Blood-brother in the West."
(Illustrated with colored pictures.)
Tour—Farmer, Hunter, and Fisher Indians.
- A u g u s t** 15—Tour—African Plants, Animals, and Peoples.
Motion Pictures:
An Ancient Art.
Murder.
Bits of Africa.
Sacred Baboon.
A Jungle Orphan.

This series helped to solve the vacation problem for many parents and leaders of children's organizations. Many favorable comments, and requests for a similar program for the summer of



GROUP OF AMERICAN BISON

Hall of American Mammal Habitat Groups (Hall 16). Specimens presented by Arthur B. Jones
Taxidermy by Julius Friesser. Background by Charles A. Corwin

About one twenty-fifth natural size

1930, have been received. The total number of groups coming for this series was twenty-four, and the attendance was 7,336. Of this number 4,725 represents the theatre attendance, and 2,611 the tour attendance.

Two special motion picture programs were given during the month of February:

February 12—Abraham Lincoln.
My Mother.
My Father.
The Call to Arms.

February 22—George Washington.
Yorktown.
Alexander Hamilton.

Due to the crowds, it was necessary to show each three times. The total attendance for the two special programs was 9,050.

In all, twenty-eight different programs were offered free to the children of the city and suburbs during the year, and the total attendance at these was 48,445.

In addition to the cooperation with "Topsy Turvy Times" of the *Chicago Daily News*, the following assisted by giving the programs publicity in newspaper articles and radio broadcasts: the *Chicago Daily News* and Station WMAQ; the *Chicago Tribune* and Station WGN; the *Prairie Farmer* and Station WLS; the *Chicago American*; the "Junior Journal" of the *Chicago Daily Journal*; the "Boys' and Girls' Post" of the *Chicago Evening Post*; the *Herald and Examiner*; and Station WCFL.

Thanks for films loaned for the programs is due to the United States Department of Agriculture, the Norwegian America Steamship Line, the Rothacker Film Corporation, the General Electric Company, and the Commonwealth Edison Company.

The Museum Stories for Children, written by members of the Raymond Division Staff, were handed to all children attending the entertainments. Copies of these often were furnished also to teachers, who requested them for use as reference material in classroom work. A new style of folder has made the binding of the Museum Stories possible, and the children are being encouraged to so preserve the series and establish a natural history library. Many of the stories were reprinted in the "Boys' and Girls' Post" department of the *Chicago Evening Post*.

Following are the subjects of the Museum Stories for Children issued during 1929:

Chinese Kites.
Nile Farmers.
Rubber Producing Plants.
Buried Cities.
Fossil Trees.
Cork.
Champion Fliers.
Horses—Past and Present.
Early Spring Flowers.
Salmon and Cedar Indians.
The First Cave People.
Glaciers and Icebergs.
Liberty Bell and Other Bells.
Spiders.
An Arapaho Sun Dance.
Meteorites.
Turtles.
Woodchuck.
Goats.
Wild Turkeys.
Elephants of Long Ago.

A total of 53,500 copies of these stories was printed.

LECTURE TOURS FOR CHILDREN.—As in previous years, emphasis was laid on lecture tours correlating with the school curriculums. Other tours were organized to give a general knowledge of the Museum and its activities. Groups from public, parochial, and private schools, both in the city and surrounding areas, and from clubs and other organizations, participated. In all, 480 such groups received guide-lecture services, with a total attendance of 21,576.

EXTENSION LECTURES.—Extension lectures were offered as in former years to the public schools of the city. To meet the needs of the junior and senior high schools a series of lectures was especially arranged for correlation with classwork in history and the sciences. The series embraced the following subjects:

The Story of Steel.
The Ancient Egyptians.
The Romans: Their Arts and Customs.
Our Friends, the Birds.
Animals of the Past.
Reptiles and Insects.
Wild Flowers of the Chicago Area.
Activities of Field Museum.

For presentation in the elementary schools, the following series was offered:

For Geography and History Groups—South America.

North American Indians.
Glimpses of Chinese Life.
Native Life of the Philippines.
Marcus, the Roman.
Ptahhotep, the Egyptian.

For Science and Nature Study Groups—Story of Flax and Cotton.

Story of Silk and Wool.
Story of Coal and Iron.
Food Fish of the World.
African Animals.
American Fur-bearers.
Chicago Mammals.
Chicago Birds.
Chicago Wild Flowers.
Activities of Field Museum.

The total number of schools visited was 215, and the total number of lectures given in the schools was 496. In addition to these were several given for school clubs, at conferences, and at Camp Algonquin, which brings the total number of extension lectures presented during 1929 to 509. The total attendance at these was 180,964.

ACCESSIONS.—The Raymond Division acquired during the year 768 stereopticon slides for extension lectures, 34 negatives for making slides, and 581 prints, all made by the Division of Photography. It also received, as a gift from the United Fruit Company, Boston, material for a lecture entitled "A Trip to Banana Land," including four sets of forty-six slides each, one motion picture reel, and accessories for the same.

NATURE STUDY COURSES

In response to requests for a series of talks on natural history topics especially arranged for leaders of nature study in camps and other recreational organizations, a class was organized to meet each Thursday morning during February, March and part of April. The programs consisted of lectures followed by tours of exhibits illustrating the topics discussed.

Letters were mailed to various organizations inviting them to send representatives to participate in the class meetings. Following is a list of some of the organizations which sent representatives: the Chicago Boys' Club, the Boy Scouts of America, the Young Men's Christian Association, the Salvation Army, the Girl Scouts, the United Charities, the Wild Flower Preservation Society, the Camp Fire Girls, and the Young Women's Christian Association.

Various neighborhood clubs, social centers and settlement houses also sent representatives.

The programs for the classes were as follows:

February 7—Chicago Mammals.
 February 14—Winter Birds.
 February 21—Trees.
 February 28—Ecology of the Chicago Region.
 March 7—Geography of Chicago.
 March 14—Flowers, Ferns, and Mosses.
 March 21—Spring Birds.
 March 28—Insects.
 April 4—Fish, Reptiles, and Amphibians.
 April 11—Stars and Clouds.
 April 18—Forum.

The total number of lectures, tours and conferences held in connection with this nature study course was twenty-seven, and the total attendance was 835.

In response to a request from Mr. Allen Carpenter, Educational Director of the Chicago Council of Boy Scouts of America, that a course similar to the one presented on Thursday mornings be given for the scoutmasters of the city who could meet only on Saturday afternoons, a second course of five lectures was given. The subjects presented were substantially those of the first course, but in each lecture several of the topics were combined, as follows:

March 30—Ecology and Conservation.
 April 6—Birds.
 April 13—Plant Life.
 April 20—Reptiles, Fish, Amphibians, and Insects.
 April 27—Mammals.

The total number of lectures and conferences in the second course was ten, and the total attendance was 461. The number of nature study groups in both courses of instruction was thirty-seven, with an aggregate attendance of 1,296.

LECTURE TOURS FOR ADULTS

As in previous years the services of Museum guide-lecturers were offered without charge to clubs, conventions, and other organizations, and to Museum visitors in general. For the public 124 general tours and 386 tours covering specific subjects were arranged. Printed monthly schedules were kept at the main entrance for distribution to visitors. Hundreds of copies were sent at the beginning of each month to libraries, social settlements, retail stores, and other centers of distribution.

There were 149 special parties, including groups from clubs, conventions, colleges, and other organizations, and 391 general

public groups. The special parties totaled 4,440 persons, and the public groups 4,360, making a total of 8,800 adults who received guide-lecture service during the year.

EDUCATIONAL MEETINGS

The use of the Lecture Hall was extended to thirty-seven educational and civic groups. These meetings were attended by 1,746 persons.

On June 13, the graduating exercises and presentation of diplomas of the adult department of the public schools of Chicago were held in the James Simpson Theatre, with appropriate ceremonies. The total attendance of graduates and guests was five hundred.

RADIO BROADCASTING

Radio broadcasting for the year 1929 included talks for both adults and children. Some of these talks were presented by a member of the Raymond Division. Others were prepared for presentation by members of the broadcasting staffs of the radio stations.

During the spring course of Raymond Division entertainments for children, material for broadcasting was sent to Station WMAQ, operated by the *Chicago Daily News*, to be given during the "Topsy Turvy Times" hour. These talks correlated with the films to be shown in the James Simpson Theatre, or gave a short summary of the tours to be given in the Museum.

From February 11 to April 1 inclusive, a series of talks on "Field Museum and Its Activities" was broadcast each Monday night over Station WCFL, operated by the Chicago Federation of Labor.

During the summer course of entertainments, broadcasting material was prepared each week for various stations giving publicity to the children's programs.

To assist in the promotion of Chicago's proposed Century of Progress exposition, the Museum cooperated with WGN, the *Chicago Tribune* station, by preparing eight radio talks on the work, history, and educational value of the Museum, and its attractions for visitors to the exposition.

Among the broadcasts especially prepared for young people were those given over Station WMAQ in connection with programs presented for the schools. Three such scientific talks on "The Peoples of the Earth" were given during the fall.

A series of eleven radio talks for adults, on the Museum, its expeditions, and other activities, was broadcast from the *Prairie Farmer* Station, WLS, in cooperation with the *Chicago Daily Journal*. Speakers included the Director, several of the Curators, and other members of the scientific staff.

TOTALS.—The total number of groups receiving instruction by means of entertainments, tours, and lectures was 1,622, with an aggregate attendance of 292,882. This figure includes both the adults and children participating in Museum educational activities.

DIVISION OF PUBLICATIONS

The activities of the Division of Publications were greatly increased in the past year because an unprecedented number of scientific publications was issued by the Museum, due largely to additions to the personnel of the Division of Printing.

During 1929 the Museum distributed to the libraries, museums, and other institutions from which it receives publications for the enlargement of its own library resources, 8,951 copies of scientific publications and 2,729 copies of leaflets. About half of these were sent to institutions in the United States and its possessions, the other half being forwarded to foreign destinations through the courtesy of the Smithsonian Institution's international exchange bureau at Washington, D.C. In addition, 5,489 copies of the 1928 Annual Report of the Director and 6,132 leaflets were sent to Members of Field Museum. Sales for the year totaled 1,085 publications, 7,023 leaflets, and 12,447 miscellaneous publications and pamphlets.

Field Museum and the Child, a pamphlet which outlines the work carried on by the Harris Extension and the Raymond Division of Field Museum of Natural History among school children of Chicago, was given further distribution in 1929. It was originally published in 1928 and sent during that year to the institutions with which the Museum carries on exchange relations, to the Life, Associate, and Sustaining Members of this institution, to Chicago public grade and high schools, and branch libraries. Copies were sent in 1929 to 2,678 Annual Members, 521 clubs, parochial schools, and suburban schools, and 502 persons and institutions on a list selected from an educational directory.

An appreciable increase was made in the number of names of institutions on both the Museum's domestic exchange list and its foreign list.

Sixteen additions to the regular series of Field Museum publications were issued, one of which was anthropological, four botanical, two geological, eight zoological, and one the Annual Report of the Director for 1928. In addition to these, six numbers were added to the general leaflet series and three miscellaneous items were published. Following is a detailed list of these publications:

Publication
number

- 254.—Geological Series, Vol. IV, No. 5. Contributions to Paleontology. By Sharat K. Roy. February, 1929. 22 pages, 9 photogravures. Edition 1,275.
- 255.—Zoological Series, Vol. XII, No. 18. A Contribution to the Ornithology of Northeastern Brazil. By Charles E. Hellmayr. March 4, 1929. 268 pages, 1 map. Edition 1,016.
- 256.—Report Series, Vol. VII, No. 3. Annual Report of the Director for the Year 1928. January, 1929. 224 pages, 20 photogravures. Edition 7,663.
- 257.—Zoological Series, Vol. XVII, No. 1. The Birds of the Neotropical Genus *Deconychura*. By John T. Zimmer. May 18, 1929. 20 pages. Edition 1,068.
- 258.—Botanical Series, Vol. IV, No. 6. I. Supplement to the Flora of Barro Colorado Island, Panama. By Leslie A. Kenoyer and Paul C. Standley. II. Two New Species of *Chara* from Tropical America. By M. A. Howe. July 5, 1929. 22 pages, 6 photogravures. Edition 1,040.
- 259.—Botanical Series, Vol. IV, No. 7. Spermatophytes, Mostly Peruvian. By J. Francis Macbride. July 5, 1929. 32 pages. Edition 1,100.
- 260.—Geological Series, Vol. V, No. 2. The Mineral Composition of Some Sands from Quebec, Labrador and Greenland. By James H. C. Martens. July 12, 1929. 17 pages, 3 zincs. Edition 1,611.
- 261.—Zoological Series, Vol. XVII, No. 2. A New Rodent from the Galapagos Islands. By W. H. Osgood. July 12, 1929. 6 pages. Edition 1,105.
- 262.—Zoological Series, Vol. XII, No. 19. Contents and Index to Volume XII. Numbers 1 to 19. October, 1929. 34 pages. Edition 1,085.
- 263.—Zoological Series, Vol. XVII, No. 3. Birds of the James Simpson-Roosevelts Asiatic Expedition. By Charles E. Hellmayr. October 18, 1929. 120 pages. Edition 1,064.
- 264.—Botanical Series, Vol. IV, No. 8. Studies of American Plants—I. By Paul C. Standley. Studies of American Plants—II. By Paul C. Standley. October 24, 1929. 152 pages. Edition 1,051.
- 265.—Zoological Series, Vol. XVII, No. 4. The Land Mammals of Uruguay. By Colin Campbell Sanborn. October 24, 1929. 24 pages. Edition 1,068.
- 266.—Zoological Series, Vol. XIII, Part VI. Catalogue of Birds of the Americas. By Charles E. Hellmayr. November 14, 1929. 264 pages. Edition 1,530.
- 267.—Botanical Series, Vol. IV, No. 9. Honduran Mosses—Collected by Paul C. Standley. By Edwin B. Bartram. December 10, 1929. 18 pages, 3 photogravures. Edition 992.
- 268.—Anthropological Series, Vol. XIX, No. 1. Melanesian Shell Money in Field Museum Collections. By Albert B. Lewis. December, 1929. 36 pages, 25 photogravures. Edition 1,015.

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- 269.—Zoological Series, Vol. XVII, No. 5. A Study of the Tooth-billed Red Tanager, *Piranga Flava*. By John T. Zimmer. December 18, 1929. 54 pages, 1 map. Edition 1,022.

LEAFLETS

- Anthropology, No. 28.—The Field Museum—Oxford University Expedition to Kish, Mesopotamia, 1923–1929. By Henry Field. November, 1929. 34 pages, 14 photogravures, 2 maps. Edition 2,993.
- Geology, No. 10.—Famous Diamonds. By O. C. Farrington. February, 1929. 28 pages, 4 photogravures, 1 colored plate. Edition 6,023.
- Geology, No. 11.—Neanderthal (Mousterian) Man. By O. C. Farrington and Henry Field. September, 1929. 16 pages, 8 photogravures, 1 map. Edition 6,056.
- Geology, No. 12.—Cement. By H. W. Nichols. September, 1929. 16 pages, 4 photogravures. Edition 3,036.
- Zoology, No. 10.—The Truth about Snake Stories. By Karl P. Schmidt. January, 1929. 20 pages, 1 cover design. Edition 3,045.
- Zoology, No. 11.—The Frogs and Toads of the Chicago Area. By Karl P. Schmidt. March, 1929. 16 pages, 4 photogravures, 1 colored plate, 1 cover design. Edition 3,002.

MISCELLANEOUS PUBLICATIONS

- Memoir Series, Vol. I, No. 2.—A Sumerian Palace and the "A" Cemetery at Kish, Mesopotamia. Part II. By Ernest Mackay, with preface by Stephen Langdon. December 26, 1929. 152 pages, 42 photogravures, 1 map. Edition 1,472.
- Field Museum and the Child. 34 pages, 8 photogravures, 5 halftones. Edition 4,070.
- General Guide. Thirteenth Edition. 38 pages, 1 photogravure, 3 zincs. Edition 8,530.

POST CARDS.—The installation of two accessible card stands, which permit of an easy view and selection, helped to bring the total of post cards sold up to 161,226, an increase of more than 28,000 over the 1928 sales.

Sets of post cards were issued in October. An endeavor was made to serve the interest of the public and to make each series interesting and instructive by supplying on each card specific data as far as space permitted. It is hoped that these sets will contribute their share in disseminating knowledge of the Museum and its collections.

Twenty-seven sets, containing a total of 289 cards, were issued by the Department of Anthropology and illustrate selected objects from the collections of the Museum. China, Tibet, India, Mexico, Peru, Melanesia, Egypt, Benin, and Cameroon are the countries represented. The objects were chosen with a view to popular appeal and grouped under such headings as bronzes, pottery, sculpture, costumes, masks, and carvings.



ANCIENT MESOPOTAMIAN BARLEY

(Hall 25)

Charred grains of six-rowed barley excavated on site of Kish by the Field Museum-
Oxford University Joint Expedition to Mesopotamia

Three times natural size

The two sets thus far issued by the Department of Geology have been greatly in demand. They depict Neanderthal Man and the mural paintings of prehistoric landscapes, plants, and animals. The Department of Zoology's post cards illustrate apes and monkeys, rodents, marsupials, insects, moths, butterflies, skates and rays. Of the zoological subjects 2,200 cards were sold during the last three months of the year. One set was issued showing seven types of exhibition cases loaned to Chicago schools through the N. W. Harris Public School Extension. Additional views will be prepared by the various Departments from time to time.

LIBRARY

The accessions of the Library during 1929 consisted of 3,105 books and pamphlets, acquired variously through gifts, purchases, and exchanges.

The gifts received from friends of the Museum and from members of the Staff are all useful, and in several instances have consisted of rare and unusual works. The largest single gift was received from Mr. John P. Kellogg, of Chicago, who presented a collection of especially valuable books to the Anthropological Library. Such gifts indicate in a material way interest in the Museum's work that is greatly appreciated.

The Library relies largely upon exchanges received from contemporary institutions throughout the world to increase its collections. During the year publications were received from 748 institutions and individuals, and sixteen new exchange arrangements with foreign societies were established. From the John Crerar Library, Chicago, there were received in exchange for the Museum's publications 259 reprints of botanical papers that will be exceedingly useful in the work of the Department of Botany.

Among the periodicals purchased during 1929 that filled in some of the incomplete sets of the Botanical Library, were the early volumes of *Curtis's Botanical Magazine*. This purchase comprised 125 volumes, from 1777 to 1843, and is an unusually fine set which brings the Museum's file of this magazine complete to date. Also purchased were the *Botanische Jahrbücher*, Volumes I-XXXIII; Fedde's *Repertorium specierum novarum regni vegetabilis*, Beihefte, Volumes II-LI; Hooker's *Icones plantarum*, Series 3, Volumes I-X, and *Flora of Tropical Africa*, by Oliver and others, nineteen volumes.

Other works purchased were *Iconum botanicarum index Londinensis*, in six volumes; Ascherson and Graebner, *Synopsis der mitteleuropäischen Flora*; Cortés, *Flora de Colombia*; Moricand, *Plantes nouvelles d'Amérique*, 1833-46; the fifth and last volume of *North American Wild Flowers*, by Mary Vaux Walcott; Bertholet, *Religionsgeschichtliches Lesebuch*; Chardin, *Travels in Persia*; Dampier, *New Voyage round the World*; *Mural Paintings of Tel El-Amarnah*; Sarasin, *Ethnologie der Neu Caledoner und Loyalty Insulaner*; Stein, *On Alexander's Track to the Incas*; Steinen, *Die Marquesaner und ihre Kunst*; Lacroix, *Minerals of Madagascar*; Lee, *Stories in Stone*; Weber and Beaufort, *Fishes of the Indo-Australian Archipelago*; Perrier, *Traité de zoologie*; Beaufort, *Birds from Dutch New Guinea*; Bechstein, *Ornithologisches Taschenbuch*, 1802-12; Naumann, *Ueber den Haushalt der nordischen Seevögel Europa's*, 1824; Maynard, *Warblers of North America*; Yerkes, *The Great Apes*; Forster, *Indische Zoologie*, 1781; Schreiber, *Herpetologia Europaea*; and the fourteenth edition of the *Encyclopaedia Britannica*.

Among activities of the year was the unpacking of some forty large boxes of books and pamphlets that had been stored for years. These boxes contained books and papers duplicating works on the shelves of the Library or for other reasons no longer applicable to the work of the Museum. It was necessary to reduce drastically this large collection. A general classification of all the items included was made, and for convenience they were temporarily stored in stacks in one of the rooms on the ground floor. Among the duplicates were many items that would be useful for redistribution by the institutions from which they were originally obtained. Upon inquiry it was found that some of these institutions desired them, and boxes of them were returned to the United States Geological Survey, Washington, D.C., the American Museum of Natural History, New York, and the New York State Museum, Albany. The Museum of Science and Industry, Chicago, was given five boxes of publications selected from this collection by a member of its staff. Approximately one thousand excerpts and reprints of ichthyological papers from early periodicals and serials, now difficult to obtain, were sent to the Shedd Aquarium library, and 200 volumes of Russian literature were sent to the University of Chicago. Several hundred excerpts and reprints were sorted according to subject and distributed among the departmental libraries of the Museum. When this work can be completed it will be possible to use the remainder

as exchange material for that offered from time to time by other institutions.

Cards indicating the additions made to the periodicals in the Library during the year are being supplied for a supplement to the Union List of Serials whose index is indispensable for information relative to old and new periodical literature.

There were received during the year 8,137 individual issues of journals, periodicals and serials.

There were prepared, forwarded and returned from the bindery 736 volumes. Cards for 8,047 different titles were typewritten and added to the various catalogues. Monthly deposits of author cards were received from the John Crerar Library totaling 9,360 cards for the year.

EXPEDITIONS AND RESEARCH

ANTHROPOLOGY.—During the year three expeditions were operating in the interest of the Department of Anthropology.

The Museum's work in British Honduras, inaugurated in 1928, was continued this year. This expedition, known as the Second Marshall Field Archaeological Expedition to British Honduras, was again under the leadership of Assistant Curator J. Eric Thompson, and was in the field from December, 1928, to June, 1929.

During the first month Mr. Thompson lived at San Antonio in the south of British Honduras, where he was engaged in obtaining ethnological information. San Antonio is a village of about 600 inhabitants, all of whom are pure Maya, descendants of the ancient people who built up the great Maya civilization. In order to make a thorough study of their religion and customs, Mr. Thompson lived exactly the same life as they do, lodging with a Maya family and subsisting on the native food. A wealth of ethnological data was secured, including records of a considerable number of traditions and legends that are undoubtedly many hundreds of years old. Considerable light will also be thrown on the religion of the Mayas by the information obtained in San Antonio. The Mayas are nominally Catholics, but still retain much of their old faith. The results of these ethnological researches are in course of publication.

Early in 1929 Mr. Thompson proceeded to Belize, where, after purchasing stores, he proceeded to the ruins of Tzimin Cax, Cahal

Pichic, and Hatzcap Ceel, situated in the south of the Cayo District close to the Guatemala frontier. Seventeen San Antonio Mayas accompanied him as laborers. Practically none of them had ever been away from the vicinity of their village before.

To reach the ruins it was necessary to travel two days up the Belize River in a small launch, thence three days on mule-back through a dense, uninhabited forest. These ruins had been discovered the previous year by Mr. Thompson while conducting the First Marshall Field Archaeological Expedition to British Honduras. This year more extensive excavations were carried out, with the result that the sequences of culture in that area were more clearly brought out through the discovery of stratified pottery and graves of different periods superimposed one upon another. A small, round altar was found at Hatzcap Ceel giving the date 9.19.0.0.0. 9 Ahau 18 Mac, corresponding to June 28, A.D. 810 (in the correlation adopted by the Museum). This date fits in with that of the altar discovered last year, the date of which is 10.0.5.0.0. 13 Ahau 13 Uo, just twenty-five years later. However, most of the objects excavated, including jade, painted pottery, filed and inlaid teeth, and a mirror of iron pyrites, are of an earlier date.

At the close of the activity at these sites, a visit was paid to the ruins of Uaxactun and Tikal situated in the heart of the great forest-covered Peten District of northern Guatemala. At the former site a comparison was made between the pottery types discovered there by the Carnegie Institution and those discovered by the Field Museum expeditions. It was found that the artifacts and types of pottery were the same in both areas, showing that they must have formed part of the same cultural zone in ancient times.

Subsequently the ruined city of Copan in the Republic of Honduras was visited. There a new stele (No. 26) was found. This stele had been re-used as one of the steps on the northwest side of the great plaza. Only a portion of the inscription was preserved, and this yielded no date, but the style of the carving shows plainly that the monument dates from the early period. It had been carved on three sides, if not on all four.

A collection of Guatemalan textiles was obtained in the highlands of Guatemala. The natives in this region are also of the Maya stock, but speak different languages. They are excellent weavers, and the cotton blouses of the women embroidered with designs of birds and animals are very spectacular.

In June, with the arrival of the rainy season which precluded further work, Mr. Thompson returned to Chicago.

Under the patronage of Mr. Frederick H. Rawson, ethnological field work in Africa was undertaken this year for the first time in the history of the Museum. The Rawson-Field Museum Ethnological Expedition to West Africa, headed by Mr. Wilfrid D. Hambly, Assistant Curator of African Ethnology, was organized to make studies of the tribes of Angola (Portuguese West Africa) and Nigeria (British West Africa), countries which have been but little explored. Mr. Hambly left Chicago on February 18, and after making preparations and official arrangements in England for his expedition, proceeded to Antwerp and thence sailed to Angola. He stopped at the port of Loanda, capital and administrative center of the Portuguese colony, where the plans of the expedition were approved by the High Commissioner for Angola. He arrived at Lobito, the chief port of the territory, on April 29, and left for the interior on May 11, using the railway which runs for about 700 miles across the colony into the Belgian Congo. He established his base at Elende, Benguela, which is the center of the Ovimbundu, a most numerous and powerful tribe, who occupy the major portion of Angola. He made a thorough study of the domestic life of these people, their agriculture and industries, social organization, customs and habits, folklore, magic, and religion. With Elende as his base of operations, he made three arduous journeys which carried him far into the interior of the country in all directions.

In August he undertook a journey into the country of the Esole, a tribe living in the hinterland of the port of Novo Redondo in northwestern Angola. Their villages are well hidden amid the rocks or the tall grasses and bushes of the valleys, and shelter four or five families. He made his way through this country in a motor car which was used as a base to which the collections were returned at the end of each day. The Esole tribe differs from the Ovimbundu in both outward appearance and language. They decorate their bodies with red pigments, tattoo concentric circles around their eyes, and file their upper and lower incisors to very sharp points. They are good agriculturists, cultivating small patches of ground on precipitous and seemingly barren slopes. Maize is one of their staples and is stored on the cob. Pottery made by their women is the finest in Angola. An interesting

object obtained from this tribe is an ancient ax formerly used by the king both as a symbol of authority and as a weapon for beheading offenders.

On the return journey from the Esele country Mr. Hambly passed through the district of Bailundu, also inhabited by Ovimbundu, where he made a collection of charms and magical appliances. He then covered several thousand miles in the interior of Angola eastward and northward to obtain collections representative of the tribes surrounding the Ovimbundu people. Some very rare masks and costumes were collected, and several ceremonies, such as the initiation rites of boys and the healing of the sick, were witnessed on this tour. In September he returned to Lobito, taking passage to Matadi on the Congo and proceeding to Nigeria, where he will operate until the end of January, 1930.

Measurements of fifty-four adult males and sixty large photographs of racial types were obtained. Five reels of motion pictures (more than 2,000 feet) were made, the subjects being the native blacksmith's craft; basket, pottery, and mat making; dances, and a funeral. Some 500 still pictures were taken. Fifty cylinders of records of drum music and specimens of the Ovimbundu language were taken on the dictaphone. The blacksmith work was studied in great detail, and tools and products of the forge have been acquired. A collection of 1,239 objects, including some excellent wood carving, pottery, and basket work, was brought together. Snakes, lizards, and other reptiles whose skins are used in native industries or which play a significant role in native folklore were also collected.

The Field Museum-Oxford University Joint Expedition to Mesopotamia, financed by Mr. Marshall Field and Mr. Herbert Weld, completed its seventh season at Kish, Irak, working from the early part of December, 1928, till the middle of March, 1929. The direction of the field work was again entrusted to Mr. L. C. Watelin, who was assisted by his son, Mr. René Watelin, and by Mr. T. K. Penniman of Trinity College, Oxford, who was in charge of the excavation of human skeletal remains. The general supervision of the expedition's activities was, as in previous years, in the hands of Professor Stephen Langdon of Oxford University.

Two hundred laborers were employed in the work of excavation this season. The digging of a small trench for the purpose of laying the tracks for a narrow gauge railroad resulted in the discovery of ten Babylonian sarcophagi of bluish-gray pottery, shaped

like bathtubs and containing human skeletons. They were found at a depth of three feet. In each case the body was lying on its left side. In some cases the body was in the sarcophagus, which then was without a cover; in other cases the sarcophagus was placed over the body. One curious sarcophagus was found, made of two hemispheres of pottery fitted together and containing the remains of an old man. Although the skeletons were in a rather poor state of preservation, they revealed many interesting racial characteristics. The bones were large and indicated muscularity, and the skulls were uniformly dolichocephalic, with narrow noses, and large, much-worn teeth.

The main result achieved in the progress of excavation this season is that virgin soil has ultimately been reached about ten feet beneath the present water level, or sixty feet below the top of the mound. The fact has been ascertained that between water level and virgin soil the city of Kish was destroyed and reconstructed three times. The periodical demolition of the walls appears to have been caused by local inundations. Mr. Watelin discovered in horizontal layers consisting of clay deposits evidences of three floods, the most important of which he dates at 3300-3200 B.C. This great flood was followed by two lesser ones which in each case destroyed the whole or part of the city. Mr. Watelin contends that it is impossible to state at present which of these floods may be identical with the deluge recorded in the Old Testament, and states that investigations in different localities are required to settle this question definitely.

The capital result of this season is the discovery in the lowest strata of numerous flint implements of novel and varied types, such as have never been found in Mesopotamia before. Stone implements previously gathered in Mesopotamia on the surface of mounds were of a limited variety of forms, and had been accidentally pushed up from the depth of the mounds as these were gradually rebuilt. In other words, they were not found in the strata in which they had been left. At Kish, however, the flint implements were actually encountered *in situ*, at a depth of about eighteen feet, among a mass of flakes and rejects, which go to prove that the flints were manufactured in the very place where they were encountered. Saws and sickle blades embedded in a layer of bitumen for the attachment of wooden handles, knife blades, drills, scrapers, and axes were brought to light. A very curious small implement of irregular shape, with a very sharp point, was

found in abundance, and may have been used for making perforations in wood, leather, shell, or other soft materials. Bone drills which also occur abundantly were used at the same time with flint drills. Mr. Watelin, who has published a well illustrated article on the lithic industry of Kish in *L'Anthropologie*, has arrived at the conclusion that these flints date to about 4000 B.C. and that on the whole they point to a strictly lithic or neolithic period. However, copper is not entirely absent from this stratum; at least a long and thin copper needle and a cylinder of bitumen wrapped in copper foil were discovered. Metal, at any rate, was rare at that time and presumably restricted in its use to ornaments, while all implements for domestic and industrial purposes were made of flint.

Other objects found in the deep strata are statuettes of crude earth and bitumen, the latter representing figures of bearded gods in profile, the hair falling down in tresses on all sides of the head. The shoulders are square, the arms project from the body, and the legs are represented only by a cylindrical support. Animal representations are frequent. A model of a chariot with its team was found. The driver is standing on the shaft of the vehicle, directing a pair of animals close to the chariot and five others farther forward. According to Mr. Watelin's calculations, this chariot model belongs to the period of the third reconstruction of the city, which took place about 3300–3200 B.C.

The vicissitudes and successive destructions of the city have not been favorable to the preservation of pottery, which is found to have been smashed on the pavement. The fragments point to a coarse ware turned on the wheel and intended for everyday use. Several broken vases were found, badly fired and coated with a red pigment; other sherds are painted exclusively in black or in red, and are intersected by lines; other sherds are of a fine, black pottery. Many fragments bear incised geometrical designs. In the lower strata, beneath the water level, several pieces of fragmentary pottery were encountered with painted designs on the same order as those previously found at Jemdet Nasr; others have a unique decoration of painted concentric lines in brown, apparently made with a comb.

The stratification now obtained permits the establishment of a chronology in a series of seven periods down to the Neo-Babylonian epoch of the sixth century B.C. The lowest stratum, about twenty-seven feet below the level of the plain and ten feet beneath the present water level, is occupied by the earliest Sumerian culture

which, according to Professor Langdon, is not later than 4000 B.C., and this is the date adopted by him for the foundation of the city of Kish. It is this stratum which contained the flint implements, the black and red pottery, as well as the monochrome and polychrome pottery like that excavated at Jemdet Nasr.

Mr. Watelin also discovered a polychrome terra-cotta head portraying a Sumerian, half natural size (about 3000 B.C.), which he believes is the only example of painted statuary known in Sumerian art. The face is yellow; hair, beard, eyebrows, and eyelashes are indicated in black. In the division of the objects, this head was retained by the Museum of Bagdad. He likewise found a tomb containing copper vases in a rather good state of preservation and a very beautiful copper object, a support for a vase made of coiled copper wire in which a tall stone vase had been placed. Two or three hundred fragments of Babylonian tablets and about twenty Sumerian tablets were also brought to light.

Assistant Curator Thompson completed a monograph on the ethnology of the Mayas of central and southern British Honduras. The material for this work was obtained by him during the course of his four visits to British Honduras, the greater part of it, however, in 1929 when he conducted the Second Marshall Field Archaeological Expedition to British Honduras. The majority of the laborers employed in the excavations consisted of Maya Indians. Although usually very reticent about their customs and beliefs, they were more willing to volunteer information when far from their own homes. This information sheds much light on the life of the Mayas at the height of their civilization, particularly of the rank and file. Much information, too, was obtained on Maya religion. On the arrival of the Spaniards in Central America, the old religion was overthrown, and the priests exterminated. The simple religion of the layman, however, persisted, although only practised in secret. This study of the modern Mayas permits a close reconstruction of the religion of the Maya peasant stock of a thousand years or more ago. Previously only the religious concepts of the small group of educated priests and nobles were known, and even these imperfectly. Steps in religious fusion among the Mayas 1,500 years ago can now be traced in the light of the new information obtained. This study of the modern Mayas is now in press, and should be available early in 1930.

Assistant Curator Henry Field has made good progress on a report which will give the results of his expedition into the Arabian Desert,

the first part of which it is planned to publish in the coming year. Both geological and archaeological evidence points to the fact that in prehistoric times this desert was fertile and well-watered, and able to support a large semi-nomadic population. Many geological specimens brought back by the expedition now await identification and chemical analysis. The evidence now available would suggest that in a prehistoric age this area lay upon one of the old lines of migration between Africa, Asia, and Europe, so that new light will be thrown upon the question of the ancient population of the Near East. Assistant Curator Field also prepared anthropometric and statistical tables of 550 inhabitants of the Kish area.

An interesting discovery was made this year in tracing three lots of barley in some of the pottery jars excavated from the low strata of the ruins of the ancient city of Kish. Botanical investigation disclosed the fact that this barley is of the six-rowed variety (see Plate VI), and this, as far as is known here, is the first actually brought to light in Mesopotamia. Barley seeds of the four-rowed variety were formerly discovered at Nippur. The six-rowed type is the characteristic prehistoric barley which was known to the Indo-European nations, numerous examples of which have been found in the Swiss lake dwellings. It is this species which was taken along by the Anglo-Saxons on their migration from their original home to the British Isles and then cultivated by them in England. In view of the discovery of the six-rowed barley at Kish the conclusion is now warranted that this cereal, so important in the development of agriculture, was first brought into cultivation at a prehistoric date in Mesopotamia where the wild species also occurs, and that the cultivated species was diffused from that center to all other countries of the Near East, Egypt, and Europe.

Curator Berthold Laufer completed the manuscript of a detailed study entitled *Geophagy* in which the curious practice of earth-eating is traced in China and all other parts of the ancient and modern world. Numerous new data and results of research are contained in the work. He also contributed a number of articles to scientific publications of this country, Canada, and England.

Professor Frank E. Wood, a volunteer worker in physical anthropology, spent the first part of the year in the computation of averages, indices, and coefficients of the 300 Peruvian skulls measured by him last year. He also gave a preliminary cleaning and treatment with shellac to the forty Eskimo skeletons obtained

by Dr. W. D. Strong in Labrador, and measured about half of the skulls. He made the mathematical computations based on the measurements of 200 living Eskimos taken by Dr. Strong, and prepared the plates and descriptions of trepanned skulls from Peru to be used in connection with Professor Roy L. Moodie's work on *Roentgenologic Evidences of Disease and Injury in Ancient Unopened Mummy-packs from Egypt and Pre-Columbian Peru, in Field Museum of Natural History*.

BOTANY.—The collections of the Department of Botany were greatly enriched during 1929 by the results of the several expeditions conducted by the Department or with which it cooperated. The most valuable additions to the Department's collections were procured in this manner.

Of greatest importance was the Marshall Field Botanical Expedition to the Amazon, which with its separate divisions amounted in effect to two expeditions. This expedition got under way at the end of January when Acting Curator B. E. Dahlgren, accompanied by Mr. Emil Sella of the Department's Staff, sailed from Jacksonville for Belem, the Brazilian port usually known as Pará from the name of the state of which it is the capital. The departure of the third member of this expedition, Mr. Llewelyn Williams, Assistant in Wood Technology, who was to proceed to Iquitos, Peru, to collect herbarium specimens and woods, was delayed until later in the year when weather conditions would be more favorable for his work.

Headquarters were established in Belem, at the mouth of the Amazon. This city, close to the equator, has two well-known museums of its own, the Museu Paraense, better known as the Museu Goeldi, devoted to natural history, and the Museu Commercial, dealing with forest and other economic products of the region.

In view of the almost total absence from the Department's collections of specimens from this region, of the strategic location of the city at the entrance to the entire Amazonian river system, and its importance as the principal point of export for the tropical produce of a region as large as all of Europe, it seemed to possess great possibilities as a collecting ground. It was hoped to obtain material for the Department's exhibits, collections of woods and other economic material, and interesting specimens to be reproduced for the Hall of Plant Life. The Department had long desired to make first-hand acquaintance of the possibilities and conditions for work in this region, which undoubtedly has more to offer in the way of collecting and material for study than any other part of the

American continents. The presence of the two museums in Belem, both devoted exclusively to the natural history and products of the region, also offered unusual advantages.

The rainy season was selected for arrival at Pará, as it had the important advantage of being the general time of ripening for most of the fruits it was hoped to obtain, which could not be had in the drier season. The rainy months, however, turned out to be far wetter than usual. Nevertheless, it was decided to collect immediately in Pará and environs all the material possible, especially that for plant reproductions and the economic material offered by the markets.

Previous field work in the American tropics had already supplied the Department with most of the easily obtainable economic plants to be found there, but it was evident that in spite of this there could be secured at once many important items with which to enrich the exhibits. Some of these had long been on the Department's list of principal desiderata, e.g., the souari nut, *Caryocar*, of which two species were common under the names of piquia and piquiarana, and the sapindaceous climber, *Paullinia sorbilis*, the guarana of the Amazon. The ground-up fruits of the latter are usually marketed in stick form, and used in the preparation of a drink by the same name, which has stimulating properties similar to tea, coffee, or cola, due to the presence of an alkaloid of the nature of caffeine. Since the loss by Brazil of its virtual monopoly of the world's rubber trade through the establishment elsewhere of plantations of the Brazilian rubber tree from seeds obtained on the Amazon, the export of guarana as well as of rubber seeds has been forbidden. The plant is little cultivated, but it is interesting to learn of the recent establishment farther up the river of a Japanese plantation for the production of guarana.

An excellent coca shrub, almost a small tree, was found in flower in the botanical garden of the Museu Goeldi, far from its native habitat, which is Peru. A fine specimen of this was secured and prepared for the exhibits, where a place has long been reserved for it. It is the source plant of cocain. An excellent specimen of cinchona, the source of quinine, was also obtained in one of the small towns farther up the river. Attractive-looking big clusters of the farinaceous fruit of the pupunha, or peach palm, were to be seen almost daily in the market of Belem, and photographs and specimens were easily obtained of this and various other fruits characteristic of the locality. While fruits could readily be bought in the market, it was

not always so simple to find in each case a tree in bearing from which to obtain an adequate botanical specimen, because the produce sold in the Pará market generally was brought by small sailing vessels from various more or less distant points.

Among the most desirable collections made for the exhibits were branches of the principal kinds of rubber trees. Properly reproduced from formalin specimens with the aid of the photographs, molds, and color sketches that were always prepared for such items, and exhibited together with their respective trunks showing the methods of tapping, they will enable the Department to make a comprehensive rubber exhibit based on Amazon material. For this purpose as complete a collection of specimens as could be made was secured of the various kinds and grades of rubber and caoutchouc from various localities. This material will be given place in the Department's exhibit of industrial raw materials which is to be reorganized in Hall 28 during the coming year.

The vegetable oil industry is assuming increasing importance in northern Brazil, the city of Belem having several mills for the production of oils and fats, chiefly from palm seeds, e.g., babassu, murumuru, and others. Samples of the fruits used and their respective oils, edible or otherwise, were obtained. Tobacco of various types in characteristic and curiously wrapped packages, mandioca or cassava products in their various forms, different varieties of cacao cultivated there, and various beans, seeds, palm fibers, and woods were likewise collected.

The number of woods in this region is extraordinary, though as a matter of fact only a relatively small proportion of them have as yet found general use in the woodworking industries or in special applications. The Museum's foreign wood exhibits include some Brazilian woods, but these are all from eastern and southern states of the country. Woods from the large Amazon region have hitherto been entirely unrepresented. Planks that were secured of the twenty-five principal species of commercial woods of Pará will thus fill an important place.

For the Herbarium a valuable collection of some 2,500 numbers was secured from the vicinity of Belem and from other points visited. The important herbarium of the Museu Goeldi was examined in its entirety and every courtesy was extended by the museum officials, especially Messrs. Siqueira Rodrigues and Bento Chermont. With the kind assistance of the latter, who is curator in charge of the botanical collections, a selection was made of type specimens

to be photographed. Most of these were of the little-distributed plants of the famous Brazilian botanist Huber, a few were types of plants described by the Brazilian botanist Ducke, and a few were co-types of Ule, selected for special reasons. This work was done in connection with the Department's program, begun this year with the aid of an appropriation from the Rockefeller Foundation, for obtaining photographs of type specimens of tropical American and South American plants. One of the rooms in the expedition headquarters was used for the photography. The Museum acknowledges with deepest appreciation the cooperation given to its expedition by the officials of the Museu Goeldi.

The Acting Curator made a trip to the near-by state of Maranhao and to various points along the coast, including Ceará, Parahyba, and Bahia, obtaining in each locality the most available and characteristic woods and products. In this connection should be acknowledged gifts of cacao and a carefully prepared set of specimens of tobacco donated by Epiphania Souza Cruz and Company of Bahia. A small collection of the wood of Ceará was obtained in Fortaleza. Trips were made also on the Amazon to Marajó, to Santarem at the mouth of the Tapajoz, up the river Tapajoz to Boa Vista, and to Manaos.

A visit to the Henry Ford concession at Boa Vista, where the Field Museum party for several days enjoyed the hospitality of the management, proved especially interesting and resulted in the collection of several hundred specimens. Felling of the forest for the planting of rubber trees was about to end for the season, but was still in progress at the time the visit was made. The Museum party had thus an exceptional opportunity to test out the possibilities of obtaining wood and herbarium specimens in the wake of the woodcutters. Collecting from small trees seldom presents any insuperable difficulty, at least none beyond that of climbing or felling the trees, but the near impossibility of obtaining flowering or fruiting branches from forest giants has always been baffling to botanists. It would therefore seem that in a place such as the Ford concession, where cutting operations are conducted on a large scale and even the very largest species are felled to make room for plantings, it should be a simpler task to secure adequate specimens, but this proved far from being the case. The fall of a forest giant is no small matter. As it begins to topple, many times carrying with it smaller trees in the way, it gathers momentum until it hits the ground with a terrific crash, the concussion resulting in a cloud

of torn foliage and flowers as if an explosion had taken place. Leaves and pitch continue to whirl in the air for minutes and in descending scatter far and wide. An examination of the tree top afterwards often shows it to be practically stripped with not a flower to be found, where previously it had been literally covered with them. The one very great actual advantage of collecting woods where trees are being felled on a large scale lies in the possibility of obtaining with facility not only herbarium specimens but proper specimens of the wood, including a good representation of the heart- as well as sapwood.

The courtesies extended to the Museum party on this occasion are most gratefully acknowledged and thanks are due especially to the resident director of the work, Captain Erno Oxholm, to the physician in charge of personnel and sanitation, Dr. Clarence Falles, and to Mr. Earl Bricker and Mr. R. G. Carr. In connection with the stay in Pará thanks should be extended to the American Consul, Mr. Gerald Drew, for his invariably helpful attitude and valuable suggestions.

After the close of the work in Pará the Acting Curator returned to Chicago, stopping en route in southern Brazil, and visiting the botanical garden and its herbarium in Rio, and the herbarium in Sao Paulo to make arrangements for photographing type specimens there. It is expected that from both of these places there will be secured certain additions to the collection of negatives which is described elsewhere in this Report. The visit to these herbaria and the work accomplished in Pará at the Museu Goeldi emphasize the desirability of confining for the present the work of gathering photographs of type specimens to the larger, more important botanical centers where types are to be found in great numbers and where photographs may thus be secured with a minimum of effort and expense.

Mr. Williams, in charge of the other division of this expedition, spent most of the year in the field searching for material to increase the study series of the Department. Leaving Chicago in March, he sailed from Savannah, Georgia, for Brazil, and proceeded to Belem. There he spent only a few days, but was able to form a small collection of plants. He then proceeded up the Amazon River by steamer to Iquitos, Peru, at the head of navigation, where he established headquarters for his season's work. From Iquitos he made numerous voyages by canoe along the tributaries of the Amazon. Extended trips, each consuming several weeks, were made

up the Itaya and Nanay Rivers, and down the main river as far as the Brazilian frontier. He thus visited many localities which doubtless had never been seen previously by a botanist.

That his work has been successful is proved by the bulk and quality of the material already received in Chicago. This consists of 9,500 well-prepared herbarium specimens, and of 1,088 specimens of Peruvian woods. The wood specimens are of unusual value, due to the fact that corresponding herbarium material was obtained in each case from the same trees and shrubs from which the wood samples were taken. It is only thus that one can be certain as to the identity of the wood material, which, if not referable to its proper genus and species, is worthless for scientific purposes. This really huge wood collection, when thoroughly studied and reported upon, will furnish data concerning the wood products of the wet forests of eastern Peru, such as are available for no other part of tropical South America. The region is immensely rich in tree species, and is known to produce many kinds of lumber, some of which may prove to be of importance to the woodworking industries of the United States and Europe.

The herbarium specimens collected by Mr. Williams form the most desirable addition to the Museum Herbarium which it would be possible to obtain. They will be cited in the flora of Peru upon which Assistant Curator J. Francis Macbride is now engaged, and they will enable him to cover satisfactorily a portion of Peru which hitherto has been almost unknown botanically. It is expected confidently that the collection will prove astonishingly rich in new species of Peruvian plants, and that it will provide extensions of range for others known at present only from Brazil. Mr. Williams will remain in Peru until early summer in 1930, and by that time probably will have doubled the collections already received from him.

Dr. August Weberbauer, well-known botanist of Lima, Peru, conducted for Field Museum the Marshall Field Expedition of 1929 to Peru. Dr. Weberbauer's similar activities in preceding years have brought to the Museum an enviable amount of exceptionally desirable herbarium material to be utilized in the preparation of the flora of Peru, which is to be published by the Museum. His collections, although not so extensive as those obtained by some other collectors, are of outstanding value because of the fact that he is thoroughly familiar with the Peruvian flora, and collects only those plants which seem to him new or rare. On this account, his Peruvian collections always have been found to be rich in plants previously unknown to botanists.



MURAL PAINTING, RESTORATION OF GREAT GROUND SLOTHS AND GIANT ARMADILLOS

Ernest R. Graham Hall

Gift of Ernest R. Graham. Painted by Charles R. Knight

In February and March Dr. Weberbauer spent more than a month in the field, and obtained 888 carefully prepared and annotated specimens of plants. His work was performed in the southern province of Cuzco, from which the Museum has possessed but scant material. He collected particularly in the region of Marcapata, and the majority of his plants were gathered at high altitudes. Their study doubtless will reveal a large number of species new to the Peruvian flora, which already has been found to be so extensive.

Dr. Weberbauer's collections, with those of Mr. Williams, and the fine series presented by Professor Fortunato L. Herrera, of the University of Cuzco in Peru, and Mr. Oscar L. Haught, of Negritos, Peru, make a quite unprecedented addition to the Museum's Peruvian herbarium. When further material now expected has been received, it seems certain that Field Museum will possess a representation of the Peruvian flora which cannot be matched elsewhere in the world.

The most important systematic work ever undertaken by the Department of Botany was initiated during 1929. It was first proposed and planned by Acting Curator Dahlgren, and it has been placed in operation through a fund generously supplied for the purpose by the Rockefeller Foundation.

In systematic botanical work, which has to do primarily with the naming and classification of plants, it is essential that specimens be named accurately. This can be done with perfect satisfaction only by comparison of the plant to be named with the first, original or type specimen, upon which the Latin name of the plant originally was based. Field Museum has many such types, but since the Herbarium has been developed wholly within the past thirty-three years, the number is comparatively small. Large numbers of type specimens exist in some eastern herbaria, particularly in the Gray Herbarium of Harvard University, where are deposited the collections studied by America's greatest botanist, Asa Gray, and also in the herbarium of the United States National Museum in Washington.

In the United States during recent years a great deal of attention has been devoted to exploration and study of the botanical features of South and Central America. The early students of the South American flora were all Europeans and the types of most species described from South America are preserved in European herbaria, many of the species not being represented at all by any specimen in American institutions. In order to determine properly the

recently accumulated collections, it is necessary to have access to some of these historic type specimens, this being obtained ordinarily only by a visit at considerable expense to Europe for the purpose. For purposes of determination, a photograph of the type specimen, especially when accompanied by a fragment of leaf or flower of the original, is almost as helpful as the actual specimen itself. The value of such photographs has long been recognized by botanists, but the number of photographs made has been small, because of lack of funds for the purpose.

In 1929 Field Museum was granted by the Rockefeller Foundation a substantial sum to be used in photographing type specimens of American plants preserved in European and South American herbaria. The grant is to be continued for three years, and it is believed that the results will be of unprecedented value to American botanists in facilitating study of the tropical American flora. The negatives obtained in this manner are to be preserved in Field Museum, and prints of them will be available to other institutions which may wish to bear the actual cost of their printing. It is believed that no other development of recent years can have such far-reaching and helpful results as this in the promotion of systematic and floristic work upon tropical American plants by the systematic botanists of the United States and other parts of the American continents.

During the summer Acting Curator Dahlgren had prepared at Belem, Brazil, 819 negatives of type specimens of Brazilian and Peruvian plants preserved in the Museu Goeldi. These specimens, representing chiefly species described by the eminent Brazilian botanist Huber, heretofore have been quite unavailable to North American botanists. The photographs will be exceedingly useful in the determination of recent Brazilian collections acquired by Field Museum and equally so to other institutions interested in the study of the flora of that country. Many of the species represented are forest trees yielding valuable lumber, and it is expected that some of these will be associable with the collections now being made along the upper Amazon by Mr. Williams.

Further work under the Rockefeller Fund for the Photographing of Type Specimens is now being conducted by Assistant Curator Macbride in Europe. Mr. Macbride left Chicago at the end of July, going to Berlin, where he has been engaged since that time. He has received the most cordial support from Dr. Ludwig Diels, Director of the Berlin Botanical Garden and Museum, and from the

entire staff of the museum. Every facility has been provided for photographing the unequaled series of South American types owned by the garden, and the work has been successful far beyond reasonable expectations. More than 2,000 negatives already have been prepared under Mr. Macbride's supervision, and although they have not yet been received by Field Museum, prints made from some of them demonstrate that they are of superior quality, and will form an indispensable addition to any institution interested in the identification of tropical American plants. The types of several large and important families have been selected for photographing, especially types from the Andes of South America. Since most active American systematic botanists are interested to some extent in this region, it is believed that the results of the completed collection will be eminently and immediately helpful to American botanists generally. The Museum is greatly indebted to the Rockefeller Foundation for its sponsorship and financing of this highly important scientific work.

Field Museum acknowledges with the deepest appreciation the cordial interest and the generous cooperation of the director and staff of the Berlin garden, which has resulted in the favorable accomplishment of this project. It is gratifying to be able to record, also, the promises of cooperation received from the directors of other European herbaria, where it is expected that the work will be continued during the next few years.

The Department of Botany shared in one of the Museum's zoological expeditions, the William V. Kelley-Roosevelts Expedition to Eastern Asia. Mr. F. Kingdon Ward, the well-known English collector of Chinese plants, who has introduced into European and American gardens so many beautiful plants from the Chinese mountains, was attached to this expedition. In March and April, 1929, he collected plants in the southern Shan states and Burma, and in May and June he botanized in upper Laos, Indo-China. The Museum received a collection of approximately 400 herbarium specimens which he collected in these two areas.

Mr. Herbert Stevens, in connection with his zoological work as a member of the same expedition, made a large collection of plants in the high mountains of the province of Szechwan, China. It is composed largely of herbaceous plants, many of them alpine species, and it amounts to more than 2,400 specimens. When determined, as it is expected they will be with the cooperation of specialists upon the eastern Asiatic flora, these collections will

make a useful addition to the Herbarium, which needs a much better representation of the flora of eastern Asia. Asiatic specimens often are helpful for comparison with American material, since it has long been known that the floras of China and the United States have much in common.

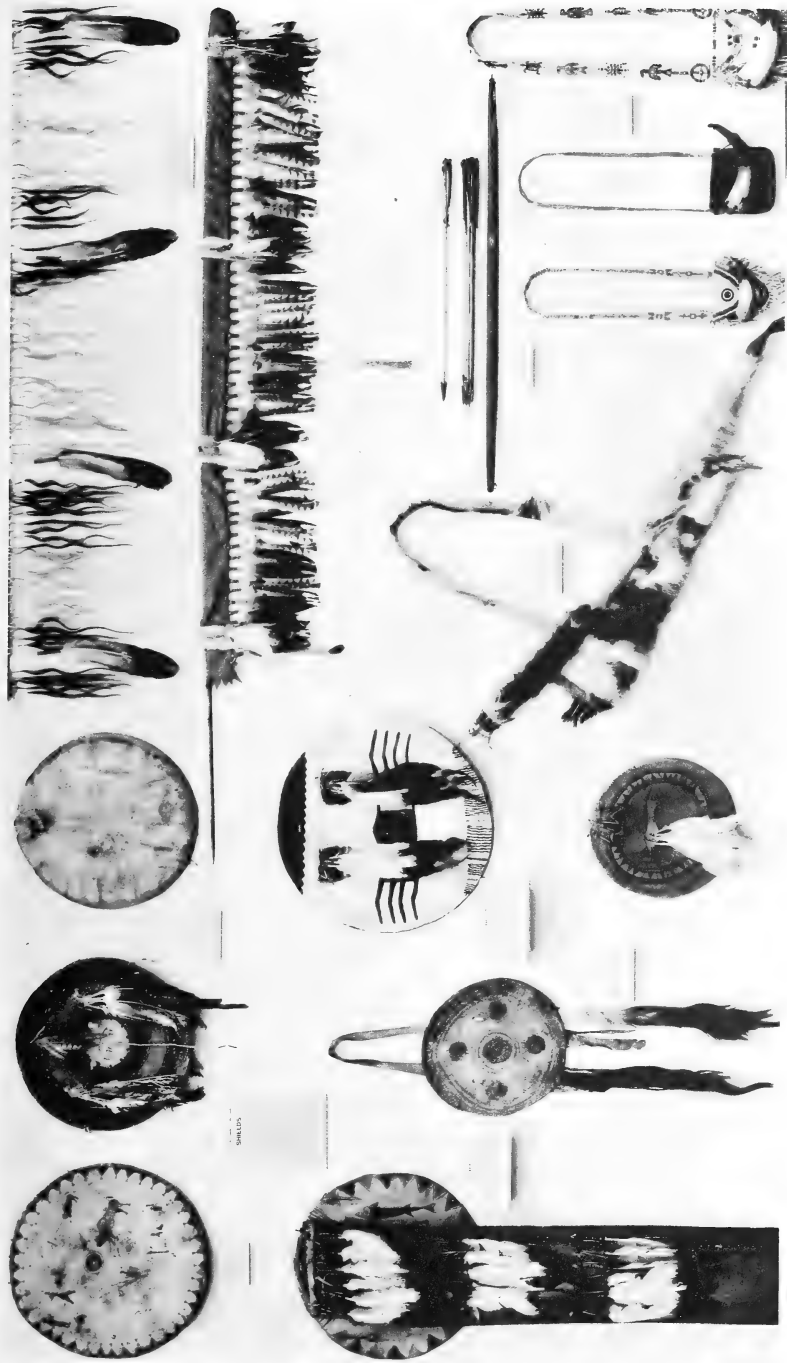
As evidence of the continued and increasing use being made of the Museum's Herbarium may be mentioned the fact that during 1929 there were published at least thirty-seven papers based wholly or in part upon its collections. Some of these papers were written by members of the Staff; others by persons who had visited the Museum and consulted the Herbarium, or had borrowed specimens for study elsewhere.

Professor Samuel J. Record, Research Associate in Wood Technology, published in *Tropical Woods*, a periodical issued by Yale University School of Forestry, a paper upon the "Trees and Shrubs Collected by F. C. Englesing in Northeastern Nicaragua." The material upon which the paper is based is deposited in the Museum's Herbarium, and the determinations were made by Associate Curator Paul C. Standley.

Mr. Standley published eighteen papers based wholly or in part upon the Museum collections. The most important of these are two long papers bearing the title, *Studies of American Plants*, printed in Volume IV of the Botanical Series of Field Museum. These are devoted chiefly to descriptions of new species which were included in the abundant collections received here for determination.

In association with Professor Leslie A. Kenoyer, of Western State Teachers' College, Kalamazoo, Michigan, Associate Curator Standley published a *Supplement to the Flora of Barro Colorado Island, Panama*, with five plates, which was issued as No. 6, Volume IV, of the Botanical Series of Field Museum. In *Tropical Woods* there appeared nine articles which Mr. Standley had prepared. Most of them dealt with new trees recently discovered in Central and South America. One described a new genus of trees from Peru, collected on one of the Marshall Field Expeditions to Peru, and named *Macbrideina*, in honor of its discoverer, Assistant Curator Macbride. Another paper by Mr. Standley which appeared in *Tropical Woods* contained a brief biographical sketch of Captain John Donnell Smith, the eminent botanist of Baltimore, who died in 1929 at the age of ninety-nine.

Mr. Standley and Mr. Macbride published jointly in Volume XXXI of *Rhodora* a paper entitled "A New Form of Red Cedar



WEAPONS AND SHIELDS OF CHEYENNE AND ARAPAHO

This exhibit is an example of the new method of installation on light-colored screens in Hall 5

from Indiana." This described *Juniperus virginiana* var. *Bremerae*, which was discovered recently in the dunes near Port Chester, Indiana.

Assistant Curator Macbride published in Volume XIX of the *Journal of the Washington Academy of Sciences* two papers dealing with problems of nomenclature. In a paper with the title *Spermatophytes, Mostly Peruvian*, which was issued as No. 7 of Volume IV of the Botanical Series of Field Museum in July, 1929, he described a large number of interesting new plants from Peru, obtained in the course of the Marshall Field Expeditions to that country. He published, also, in *Tropical Woods* three shorter papers discussing plants of Peru and other parts of South America.

Mr. Llewelyn Williams published in No. 20 of *Tropical Woods* a paper entitled "The Wood of *Caryodendron angustifolium* Standley," dealing with one of the new trees discovered by the Marshall Field Expedition to Panama, 1928.

Dr. William Trelease of Urbana, Illinois, in a paper entitled "New Piperaceae from Central America and Mexico," printed in Volume XIX of the *Journal of the Washington Academy of Sciences*, described no less than thirty-six new species and varieties of plants of the pepper family. Many of them were collected in northern Honduras by Associate Curator Standley, and the types of all of them are in the Museum Herbarium.

Professor E. E. Watson, of Michigan State College, Lansing, Michigan, in *Contributions to a Monograph of the Genus Helianthus*, an exhaustive account of the sunflowers native in the United States, cited many specimens from the Herbarium of Field Museum. Two of the new species which he described were based upon type specimens belonging to this Herbarium.

Miss Nellie V. Haynie, of Oak Park, Illinois, published in Volume XXXI of *Rhodora* two papers reporting plants of the Chicago region. She very kindly deposited in the Museum Herbarium the specimens upon which the records were based, in order that they might be preserved permanently.

Professor M. L. Fernald, of the Gray Herbarium of Harvard University, published in No. 83 of the *Contributions from the Gray Herbarium*, issued in March, 1929, a description of a new bluegrass, *Poa labradorica*, based partly upon specimens collected by the Rawson-MacMillan Subarctic Expedition.

Mr. Ellsworth P. Killip, of the United States National Museum, published in Volume XIX of the *Journal of the Washington Academy*

of *Sciences* a paper with the title "New Plants Mainly from Western South America. II," in which he described a new plant, *Loasa vestita*, whose type is in Field Museum. Dr. S. F. Blake, of the United States Department of Agriculture, was the author of another paper in the same volume, entitled "New Asteraceae from the United States, Mexico, and Honduras," in which there were described two new plants discovered in Honduras by Associate Curator Standley. There appeared in No. 20 of *Tropical Woods* a paper, "A New Peruvian Capparis," by Mr. Oscar L. Haught, of Negritos, Peru, who has contributed so much interesting Peruvian material to Field Museum Herbarium. The type specimen of this new species is in the Museum collections.

The research work of the Department of Botany, as well as the care and identification of the collections, has been greatly facilitated by the ample additions made during the year to the Library through the acquisition of important books, especially certain ones published years ago and now very difficult to acquire. The Department now has an excellent working library, at least for the study of American plants. The liberal policy of the Museum regarding the development of the Botanical Library resulted in the purchase of most of the desirable works relating to tropical American plants which were offered for sale during the year. There were acquired, also, several important books dealing with extra-American plants, such as a set of Oliver's *Flora of Tropical Africa*, and Ascherson and Graebner's *Synopsis der mitteleuropäischen Flora*.

Most important of the botanical works received were the many volumes needed to complete the Museum's set of *Curtis's Botanical Magazine*, whose thousands of fine plates are so necessary for determinative work with tropical American plants. A unique addition to the library was a photostat copy of Ruiz and Pavón's fourth volume of the classical *Flora Peruviana*. Three imposing volumes of this monumental and basic work were published at the end of the eighteenth century. They are seldom offered for sale, but the Museum is fortunate in possessing one of the few complete sets in America. Plates were engraved for a fourth volume, but the letterpress never was issued. Only three or four copies of the plates are known to exist. From one of these sets, in the library of the British Museum, through the courtesy of the director of that institution, the photostat copy now at Field Museum was obtained. So far as known, no representation of these plates

is owned by any other American library. The plates represent many plants peculiar to Peru and are almost indispensable to a study of that country's flora.

The year has been a busy one for the Staff of the Department of Botany because of the unusually large amount of material received, especially in the Herbarium. The care, labeling, determination, and distribution into the Herbarium of this material have severely taxed the resources of the Staff.

Especially urgent have been the requests from many correspondents for assistance in the determination of material. Some idea of the activity of the Herbarium Staff may be gleaned from the fact that during the year there have been determined and reported more than 13,000 specimens of plants. Of this material, 5,944 specimens were sent to Field Museum on loan, and were returned after they had been named. Of the specimens determined 7,134 were retained for the Museum's Herbarium. They included much of the most valuable material acquired by the Department during 1929, particularly specimens of numerous new species of which descriptions were prepared and either have been published or are in the course of publication.

Numerous lots of plants were received for determination from many parts of the United States, ranging from New England to California, and from correspondents in such widely separated countries as Mexico, British Honduras, Guatemala, Salvador, Honduras, Nicaragua, Costa Rica, Panama, Peru, Venezuela, Sweden, England, the Union of Socialistic Soviet Republics, Hawaii, the Philippine Islands, Japan, Denmark, France, and Germany. Material from still other countries also was determined, but was received from persons in the United States or Europe.

The monographic work upon the family Rubiaceae begun in 1928 by Associate Curator Standley has been continued during 1929. The Rubiaceae constitute one of the largest tropical American groups, and include such important plants as coffee, cinchona, and ipecac.

The prosecution of the work has been aided by the cooperation of other herbaria, which have been generous in lending the South American material in their keeping. More than 5,000 specimens of Rubiaceae were received on loan from the Royal Botanic Gardens, Kew, England, the Royal Natural History Museum of Stockholm, the Jardin Principal Botanique of Leningrad, the University Botanical Museum of Copenhagen, the United States National

Museum of Washington, the Gray Herbarium of Harvard University, the New York Botanical Garden, the Philadelphia Academy of Sciences, and the Missouri Botanical Garden, St. Louis. All this material was critically determined and annotated before being returned to the senders. Photographs were made of type specimens and of species not represented in the Herbarium of Field Museum. These have been placed in the Herbarium, and it now contains a more complete representation of South American Rubiaceae than exists anywhere else in the United States, if not in the whole world. The negatives will be placed with other negatives of types which are being obtained abroad.

As a result of the study of this large amount of material, with that of the Museum's Herbarium, there has been prepared a systematic account of that family as represented in each of the following countries: Colombia, Venezuela, Ecuador, Peru, and Bolivia. The first of these papers, that devoted to the Colombian Rubiaceae, is now in press, to be issued as the first part of Volume VII of the Botanical Series of Field Museum.

Associate Curator Standley spent a great deal of time in the determination of the collection of plants which he made in Honduras in 1927-28, and this work has been nearly completed. As had been expected, the collection was found to contain a large number of new species, descriptions of many of which have since been published. A paper was prepared enumerating the trees of Honduras, and it will appear early in 1930 in *Tropical Woods*. Another paper, listing the woody plants of Siguatepeque, Honduras, will be printed soon in the *Journal of the Arnold Arboretum*. The *Flora of the Lancetilla Valley of Honduras*, which will consist of a complete report upon the 1927-28 collection and be practically a flora of the north coast of Honduras, has been almost completed.

The *Flora of Yucatan*, which has been in preparation for several years, was completed by Associate Curator Standley near the close of the year, and submitted for publication as the concluding part of the third volume of the Botanical Series of the Museum. A paper entitled *Studies of American Plants—III* also was submitted for publication toward the end of the year.

Assistant Curator Macbride, during the first half of 1929, before leaving for Berlin to engage in the work of photographing type specimens, devoted most of his time to preparation of the manuscript of the flora of Peru, which is now well advanced. During the year he prepared the portions dealing with several

larger and more important families, particularly the Solanaceae or potato family, and began work upon the very large group, Leguminosae.

In the work of determination of Illinois and other United States plants, Mr. H. C. Benke of Chicago, as in past years, was generous in donating his time, and was of invaluable assistance, especially in the case of such difficult groups as grasses, asters, and goldenrods, with which he is thoroughly familiar. Dr. Earl E. Sherff, of Chicago, rendered valuable assistance in the determination of Compositae, especially of those groups, such as *Bidens* and *Cosmos*, with the revision of which he is engaged.

Assistant Curator James B. McNair has made a very useful card index of plants that contain large quantities of starches, sugars, gums, tannins, resins, drying oils, semi-drying oils, non-drying oils, fats, and waxes. These cards give family, species, and common names, places where native and cultivated, percentage of the respective substances yielded, and part of the plant in which located.

The information tabulated in a paper written by Mr. McNair, and now in press, on the differential analysis of starches makes it possible to analyze readily a sample of starch so as to distinguish it among some 300 starches and thus to determine not only the plant family, genus and species of its origin, but, in some cases, the variety as well—for example, sweet corn from dent corn.

Another paper on oils, also by Mr. McNair and now in press, points out the relationship between the habitat of plants and characteristics of their oils and fats, including information helpful in the differential analysis of plant oils and the identification of their botanical sources.

A third paper, on gums, tannins, and resins, likewise prepared by Mr. McNair, indicates the relation between plant habitat and gum, tannin, and resin content, their relation to each other, to specific plants, and their possible function in plants.

A botanical leaflet by Mr. McNair on Indian corn will soon go to press. This leaflet, dealing with the most important agricultural crop in the United States, should be popular and of wide interest in a locality which is the principal corn market of the country and the center of the corn producing area. It includes a consideration of the origin of corn, its varieties and areas of present cultivation, its use by the Indians, and its present importance, including the various chemical products manufactured from it, such as solvents, starch, oil, paper, and wall board.

A substantial amount of time was devoted by the Staff of the Herbarium to the distribution of duplicate material, which had accumulated in large quantities and occupied space urgently needed for other purposes. During the year 34,623 duplicate specimens were distributed in exchange to a large number of institutions and individuals. Part of this material consisted of duplicate sets of the plants collected in Yucatan by the late Dr. George F. Gaumer, of Izamal, Yucatan, and some of it represented duplicate mounted sheets removed from the Herbarium, but the greater part consisted of miscellaneous duplicate material from the United States, and of the duplicates of recent tropical American collections received for study. This duplicate material was distributed to thirty-five institutions and individuals in the United States, and to sixteen herbaria of Europe and Canada. It is expected that there will be received in return a large amount of material useful for the Herbarium of Field Museum, and, in fact, several important sets of South American plants already have been received as a direct result.

Loans made from the Herbarium during 1929 amounted to 976 specimens, lent to fourteen institutions and individuals for study or for determination. To the Missouri Botanical Garden were lent 197 sheets of *Ayenia* and *Halenia*, for use in the preparation of monographic accounts of those genera. To Mr. E. R. Bogusch, of the University of Illinois, there were lent fourteen specimens of *Phlox*, for critical study, and to the United States National Museum 299 specimens of the same genus, for examination by Dr. E. T. Wherry, who is monographing the group. To Professor Ralph W. Chaney, of the University of California, there were lent forty-one specimens of tropical American plants, for use in his investigations of certain fossil floras of the western United States. Other loans were made to the Gray Herbarium of Harvard University and to the New York Botanical Garden. To Dr. Gunnar Samuelsson of Stockholm were sent on loan forty-three specimens of *Epilobium* to be used in the preparation of an account of the South American representatives of the genus. The loan of all this material is useful not only to the persons by whom it is studied, but also to Field Museum, since it results in the critical determination of the specimens, thus greatly enhancing their value for study purposes.

As in past years, the Museum has received valuable and greatly appreciated assistance from botanists of the United States and Europe in the determination of material of certain difficult or critical

groups of plants. In most cases it has been possible to submit for determination duplicate specimens which might be retained as a return for the labor of making the determinations.

Among those who have rendered important aid in such determinative work should be mentioned the following: Mr. Edwin B. Bartram of Bushkill, Pennsylvania, who determined the mosses collected in Honduras by Mr. Standley and prepared an account of them, which has been published by the Museum; Dr. Theodor Herzog of Jena, Germany, who is studying the hepatics of the same collection, and Dr. G. Einar Du Rietz, of Upsala, Sweden, who is determining the lichens; Dr. William Trelease, of Urbana, Illinois, who has named a large number of plants of the Piperaceae, or pepper family; Professor Oakes Ames, of the Botanical Museum of Harvard University, who has identified orchids; Dr. B. L. Robinson, Dr. I. M. Johnston, and Mr. Lyman B. Smith, of the Gray Herbarium of Harvard University, who have determined material in the various groups in which they are especially interested; Professor M. L. Fernald, of the same herbarium, who very kindly named the collections of the Rawson-MacMillan Subarctic Expeditions of Field Museum; Dr. William R. Maxon, of the United States National Museum, who has determined many ferns; Mr. Ellsworth P. Killip and Mr. Emery C. Leonard, of the same museum, who have named specimens of special groups; Dr. S. F. Blake, of the United States Department of Agriculture, who identified the Compositae collected in Honduras by Associate Curator Standley, as well as material of the same family from other regions; Dr. A. S. Hitchcock and Mrs. Agnes Chase, of the United States Department of Agriculture, who have given important assistance in the naming of tropical grasses; Dr. N. L. Britton and Dr. H. A. Gleason, of the New York Botanical Garden, who have determined plants of several groups; Dr. C. L. Shear, of the United States Department of Agriculture, who has supplied determinations of fungi; and Mr. Kenneth K. Mackenzie, of Maplewood, New Jersey, who has identified specimens of the genus *Carex*.

The Department has received during the year many personal and telephone calls from persons in Chicago who wished to obtain assistance or information regarding botanical matters, and in most instances it has been possible to supply the information desired, sometimes in matters of considerable importance. Many specimens of plants have been brought or sent to the Herbarium with requests for their names by residents of the Chicago area. Appeals received

by mail for information upon a wide range of botanical subjects required a substantial amount of time for answer. The Department also has been called upon frequently for aid regarding botanical subjects by the other Departments of the Museum.

The Staff of the Department has been pleased to receive many visits from botanists who wished to consult the collections, or observe the method of their installation. Professor H. M. Hall, of the University of California, spent some time in examining material of the Compositae. Mrs. Eva M. Roush and Miss Mildred E. Mathias, of the Missouri Botanical Garden, studied the herbarium collections of Malvaceae and Umbelliferae. Professor Ralph W. Chaney, of the University of California, spent several days in comparing fossil plants with specimens in the Museum's Herbarium.

Among other visitors may be mentioned Mr. Heinrich Teuscher, formerly of the Morton Arboretum; Mr. T. Naito of the Imperial College of Agriculture and Forestry of Kagoshima, Japan; Professor C. H. Kauffman of the herbarium of the University of Michigan; Professor A. O. Garrett of Salt Lake City; Dr. G. R. Wieland of Yale University; Professor E. B. Mains of Purdue University; Professor Leslie A. Kenoyer of Western State Teachers' College, Kalamazoo; Dr. N. E. Fassett of the Department of Botany of the University of Wisconsin; Mr. C. D. Mell of New York; Dr. E. D. Merrill, Director of the New York Botanical Garden; and Dr. Th. Just of Notre Dame University. Several students of the University of Chicago have visited the Herbarium in order to study its collections.

GEOLOGY.—Associate Curator Henry W. Nichols spent the last two weeks of July collecting in the volcanic regions of Mount Taylor, New Mexico. A large and valuable collection illustrating the surface features of the lava beds and volcanic cones in that locality was secured. Headquarters were maintained at Grant, New Mexico, within easy reach by automobile of the Tertiary lavas of Mount Taylor and the San Mateo Mountains to the north, and of recent craters and lava flows of the Zuñi Mountains to the south. The district covered is largely in the United States Forest Reserve. The cordial and efficient cooperation of the United States Forest Ranger, Mr. J. H. Mimms, who knew the smallest details of the topography and lava flows, permitted an unusually complete collection to be made, with great economy of time. Thanks to his assistance, tedious prospecting for good collecting grounds was entirely eliminated.

Perhaps the most interesting specimens were those secured from Flagpole Crater on the Zuñi Mountains. This cone and crater are in perfect condition, and their lava and ashes are as fresh and unaltered as if just cooled from a late eruption. The rim of the crater was reached with some difficulty, on account of the loose cinders covering its steep slopes. This rim is a level surface about forty feet wide, of coarse, black cinders, interrupted in places by projecting pinnacles and masses of brown lavas which take very grotesque forms. The crater, which is slightly elliptical, is about 1,000 feet in diameter and has an estimated depth of 400 feet. From the cone, numerous contorted and stalactitic shapes of light-brown lava, covered with a siliceous glaze, were secured, as well as fragments of the spindle-like volcanic bombs, black scoria and light-gray lapilli or ashes of the size of fine gravel. The ice caves about a mile from this crater, where large bodies of ice persist throughout the summer, were visited but yielded no specimens of importance.

On a basalt flow from the Tintero Crater the lava was found to be as fresh as if recently cooled, and many specimens illustrating surface features as well as such phenomena as steam holes, flow structures, scoria, *et cetera*, were collected there. Among the specimens secured in the Zuñi Mountains were two slabs, two by three feet each, which illustrate two aspects of the rough *malpais* surface of the cooled lava, which was thrown into extraordinary forms by the turbulence induced by escaping steam during solidification. Several lighter slabs, about a foot square, show other interesting aspects of this lava surface. This lava is underlaid by large caverns left when the molten lava of the interior of the lava stream had continued to flow after the exterior had cooled. In many places the roofs of these caverns had fallen, thus giving access to their interiors. However, no specimens of interest were observed in these openings.

One day was spent near the government ranger station in Canyon Lobo near Mount Taylor. Here numerous specimens illustrating the features of the older lava were secured. A trip to another part of Canyon Lobo provided specimens of volcanic bombs, pumice, obsidian, flow structures, agglomerates, and similar material. A bed of wind-blown volcanic ash near Grant which has altered to bentonite was visited and specimens secured. A visit to the neighboring town of Blue Water yielded two other varieties of fine, wind-blown

ash, some silicified wood, septaria, and other material. The soil of the district is a typical loess formed from wind-blown dust, and a characteristic specimen of this was secured.

The volcanic neck, Alesna, which lies north of Mount Taylor, was visited, studied, and photographed during a violent storm, in the course of which lightning bolts were repeatedly seen striking into the impressive basalt spire which points hundreds of feet into the air. Material found here proved to be quite unsuited for exhibition and was not collected. Two other volcanic necks of a similar nature were studied, one about half a mile from Alesna, and the other in Canyon Lobo. The latter showed some very unusual features.

While the collections were being secured, about 100 photographs of volcanic and topographic features were taken. Altogether, 173 specimens were collected and 100 photographs made.

A short field trip was made by Associate Curator Elmer S. Riggs and Preparator P. C. Orr to Argos, Indiana, in order to recover a specimen of mastodon which had been encountered in digging an open ditch at that place. Through the generous cooperation of Mr. P. C. Yoder, the ditching contractor, and Mr. William Bower, the landowner, a fine specimen of *Mastodon americanus*, consisting of a skull with both tusks and lower jaws and more than half of the remainder of the skeleton, was recovered. Another find investigated at Beecher, Illinois, on the same trip, failed to produce any results of importance.

Further excavation was carried on during the year, in part under Museum auspices, at the historic fossil bone-bed near Minooka, Illinois, first discovered in 1902. Former Judge George Bedford of Morris, who was one of the discoverers of this locality and is an enthusiastic amateur collector of fossils and artifacts, undertook upon his own responsibility the further exploration of the bone-bed. This was located in a small bog from which a spring issued. From it parts of seven skeletons of mastodons of various sizes and ages had previously been removed. Mr. Bedford, during August, 1929, personally supervised exhaustive excavations and presented to the Museum the collection there secured. This collection consists of three jaws, various tusks, a pelvis, leg and foot bones, vertebrae, ribs, and numerous other parts of mastodon skeletons, together with a pair of lower jaws and a fine tusk of the Columbian Mammoth, a skull, antler, and leg bone of an extinct genus of moose, *Cervalces*, and various bones of bison and other more modern animals.

As opportunity permitted, Curator O. C. Farrington continued investigation of new meteorite falls. Descriptions of six of these, the Bishop Canyon, Kofa, Navajo, Santa Luzia, South Byron, and Tilden falls, were completed during the year, and considerable progress was made in the study of the Coldwater and Lafayette meteorites. These studies included complete chemical analyses by Associate Curator Nichols.

Curator Farrington prepared a Museum leaflet on *Famous Diamonds*, and, in collaboration with Assistant Curator Henry Field, one on *Neanderthal (Mousterian) Man*. Associate Curator Nichols prepared a leaflet on *Cement*. All of these were published during the year. Manuscript for a leaflet on *The Evolution of the Horse* by Associate Curator Riggs and Preparator Bryan Patterson was nearly completed during the year.

Professors William B. Scott and William J. Sinclair of Princeton University completed their studies of the groups of South American fossil mammals collected by the Marshall Field Paleontological Expeditions which had been submitted to them for investigation, and these studies were seen partially through the press during the year. They inaugurate Volume I of the Geological Memoirs of the Museum. Professor Scott's paper is on *A Partial Skeleton of Homalodontotherium* and gives a nearly complete description of this hitherto little known large South American mammal. It also provides data for determining the true taxonomic position of two important orders of extinct South American mammals, the relations of which have hitherto been obscure. In Professor Sinclair's paper some new species of South American fossil marsupials are described.

Two other geological publications issued by the Museum during the year were *Contributions to Paleontology* by Assistant Curator Sharat K. Roy, and *The Mineral Composition of Some Sands from Quebec, Labrador and Greenland*, by Dr. J. H. C. Martens. Mr. Roy's paper described one new genus and ten new species of various fossil forms. In Dr. Martens' paper the compositions of sands from a region of cold climates and recent weathering are described. His studies were made on specimens which he collected as a member of the First Rawson-MacMillan Subarctic Expedition of Field Museum. During the year, Assistant Curator Roy has been engaged in the study of the fossils of the Frobisher Bay region and on some Drift fossils from Labrador which he collected while on the Second Rawson-MacMillan Subarctic Expedition of Field Museum. The

results of these studies will soon be ready for publication, as will also Mr. Roy's studies of the fossil plants of Gilboa, New York, specimens of which he collected in 1926.

The demands upon the Department Staff by correspondents and visitors for information have been increasingly large during the year, and a considerable amount of time has necessarily been devoted to this work. Inquiries were received from 426 correspondents and 162 visitors, as well as an unrecorded number by telephone.

ZOOLOGY.—Eight zoological expeditions were in the field during 1929, including some of the largest and most important ever conducted under the Museum's auspices. The major ones were the following: William V. Kelley-Roosevelts Expedition to Eastern Asia for Field Museum, Cornelius Crane Pacific Expedition of Field Museum, Harold White-John Coats Abyssinian Expedition of Field Museum, Chancellor-Stuart-Field Museum Expedition to the South Pacific, Thorne-Graves-Field Museum Arctic Expedition, and Field Museum-Williamson Undersea Expedition to the Bahamas.

In addition to the larger expeditions to remote parts of the world, certain field work was also conducted nearer home. Mr. Ashley Hine worked in southern Arizona collecting birds, and Messrs. Julius Friesser and Arthur G. Rueckert made a brief trip into Canada for the purpose of obtaining Arctic plants and other accessory material needed for the preparation of exhibits. Prior to the lamentable death of Colonel J. C. Faunthorpe in India, he made some further collections in that country for the Museum. Cooperation was continued with the American Museum of Natural History in connection with the Third Asiatic Expedition of that institution.

The William V. Kelley-Roosevelts Expedition to Eastern Asia, as stated in the 1928 Annual Report, left the United States in November, 1928. This expedition was made possible through the generous support of Mr. William V. Kelley, a Benefactor and, more recently, a Trustee of the Museum. During 1929 it was carried through to a successful conclusion, resulting in a great enrichment of the Museum's zoological collections.

The objects of this expedition were to obtain certain very rare animals in remote parts of western China, to provide material of high quality for exhibition in habitat groups in William V. Kelley Hall, and to make additions to knowledge by intensive collecting in little known regions in northern French Indo-China and in southwestern China. In order to carry out this program, it was necessary

to divide into several parties, at least one of which should be able to travel rapidly, obtaining information as to rare animals from native sources, and concentrating its efforts upon these particular animals rather than upon general collecting. Accordingly, Colonel Theodore Roosevelt and Mr. Kermit Roosevelt, with their friend and co-explorer, Mr. C. Suydam Cutting of New York, constituted themselves into a fast-moving first division. A second division including several able naturalists, under the leadership of Mr. Harold J. Coolidge, Jr., was organized for detailed collecting in French Indo-China; and a third division, consisting only of Mr. Herbert Stevens of Tring, England, worked slowly and carefully in western China.

The first division proceeded via Bombay and Calcutta to Rangoon, and thence by rail and boat up the Irrawaddy River to Bhamo, near the border between Burma and China. Thence travel was northeastward by pack train via Tengyueh to Talifu, an old and well-known city in the province of Yunnan. From here the trail led almost directly north to Likiang and beyond into very elevated and difficult country where camps were seldom lower than 10,000 feet and where passes rose to more than 16,000 feet. On February 26, after more than three weeks' continuous mountain travel, much of the way in country frequented by bandits, the party reached Tatsienlu, principal settlement in the province of Szechwan. On the way, a little hunting was done near Muli on Mount Gibboh, where a specimen of the goat-antelope known as the serow was obtained. Somewhat farther on, near Chuilung, a deer related to the Indian sambar was taken, this being one of the northernmost records for the species.

As they worked northward, the hunters made frequent inquiries regarding the occurrence of large animals, but until they reached Tatsienlu they were not encouraged to give much time to hunting for the great panda or giant panda, which was a prime objective of the expedition. This bear-like animal had never been killed by white hunters, and although a few specimens from native sources had come out to European museums, they had been in most cases somewhat imperfect and poorly preserved. Reliable information about it was difficult to obtain, and it seemed quite certain that even after its habitat was located it would be very rare and hard to find. A first trial for it was made in a region only two days' travel to the northward from Tatsienlu, but this proved to be

based on false reports and the party returned to Tatsienlu. On this short trip, however, several specimens of the burrhel or blue sheep were obtained.

On March 6, the party left Tatsienlu to proceed eastward to Mouping, where definite information was forthcoming to the effect that at least one giant panda had been seen and killed in that region about ten years before. With this scant encouragement and with the knowledge that the original discovery of the animal had been in this vicinity, six days were devoted to intensive hunting in the hills near Mouping. This was laborious work near the timberline and through heavy bamboo growth in which one can see but a short distance. Old traces of the animal sought were found, but in spite of the best efforts of the Roosevelts and fourteen native hunters who accompanied them, no large game was sighted. In one place, however, they encountered a troupe of the rare and beautiful monkeys known as the golden or snub-nosed monkeys (*Rhinopithecus*) and nine specimens were collected.

From Mouping the expedition turned southward to the old walled village of Yachow and thence through fairly populous valleys to Tzetati and Tsalo. Near this last place word came that giant pandas might be found in the country of the Lolo tribe adjoining this Chinese outpost. Hence a special hunt was arranged in the vicinity of a place called Yehli at about latitude $29^{\circ} 15'$ north and a little north of the Chinese village of Tachow. This took place on April 13 and was crowned with success. The trail of a panda was found and, by persistent tracking through snow patches and thickets of bamboo, the animal itself was finally sighted and killed by the joint fire of Theodore and Kermit Roosevelt. Its skin and the entire skeleton were carefully prepared, and after very friendly relations with the supposedly savage and hostile Lolos, the party proceeded at once to Tachow and Lokow, and thence to Ningyuan by boat on the Amning River.

From Ningyuan, the expedition pushed through rapidly by caravan to Yunnanfu, arriving on May 3. Here rail connection was made for Hanoi in French Indo-China, and by coasting steamer Colonel Theodore Roosevelt hastened south to Saigon to prepare for hunting big game in the province of Cambodia. Meanwhile, Mr. Kermit Roosevelt found it necessary to return at once to the United States. Colonel Roosevelt hunted in the hot lowlands for seladang, banting, and water buffalo to fulfill requirements for large

habitat groups of these animals for the Museum. He worked under great difficulties without expected assistance and obtained a sufficient number of the needed specimens to ensure the building of the groups.

The second division of the Kelley-Roosevelts Expedition was organized for more detailed work with a somewhat larger personnel, as follows: Mr. Harold J. Coolidge, Jr., of Cambridge, Massachusetts, division leader; Mr. Russell W. Hendee, of Brooklyn, New York, mammalogist and artist; Dr. Ralph E. Wheeler, of Cambridge, Massachusetts, physician and naturalist; and Dr. Josselyn Van Tyne, of Ann Arbor, Michigan, ornithologist.

This division arrived in Hanoi in northeastern French Indo-China on February 1, after a main base had already been established in Hué in the province of Annam and some preliminary collecting done near that coastal locality. On February 9, the expedition proceeded by rail from Hanoi to Lao Kay on the Chinese border of northern French Indo-China in the province of Tonkin. Subsequent work was confined almost entirely to the central and western part of this province, and in the adjoining province of Laos, a mountainous region difficult of access and not previously explored by zoologists.

From Lao Kay, the party traveled westward by pack train for seven days to Lai Chau in the vicinity of which work was carried on until April 14. At this place a division was effected by which Messrs. Coolidge and Hendee worked in neighboring localities to the northward while Messrs. Van Tyne and Wheeler worked to the southward. Rejoining at Lai Chau, they then continued westward for ten days to Phong Saly, which formed another base of operations.

Here work was continued until June 6, but, while the others remained, Mr. Hendee started on May 14 to push out rapidly for Saigon in Cochin China where he expected to meet Colonel Theodore Roosevelt and assist him in collecting large mammals for group purposes. At this time the onset of the rainy season brought increased hazards to health and made further travel with horses impractical. Therefore, in accordance with previous plans, the return to the coast was made by river travel which was possible for more than a thousand miles via the great Mekong River and its tributaries.

Shortly after Mr. Hendee left the other members of the party he was attacked by a malignant malarial fever. This was about May 27, two days after leaving Luang-Probang on a well-appointed

raft by which weekly mail service is maintained between that point and Vientiane. Sharing the raft with him was M. Chevalier, a French inspector of schools, who gave him all possible care; but the fever increased and when the raft reached Vientiane, June 3, he was in a very serious condition. Here he was taken to a hospital and placed under the care of two French physicians, Dr. Luisi and Dr. Cardirat. In spite of their best efforts to save him, he died three days later. The sad news was communicated to his colleagues who were then on their way to Luang-Probang by the route he had just taken. They hurried on to Vientiane where, with great sympathy and full cooperation extended by the French officials, appropriate services were held.

On July 7, Messrs. Coolidge, Van Tyne, and Wheeler arrived with the collections at their original base at Hué in the province of Annam. At this time two of them also were suffering from tropical illness, and all were shocked and saddened by the recent untimely death of their comrade, whom they all greatly admired. They proceeded to Saigon and there disbanded on July 22, returning by various routes to the United States.

Mr. Herbert Stevens, traveling in western China, for the most part alone, constituted a third division of the Kelley-Roosevelts Expedition. He accompanied the Roosevelt brothers a short distance beyond the border between Burma and China, and then on January 5 he continued northward from Tengyueh with his own caravan, working slowly and making varied collections on the way which were impossible for the fast-moving first division. Mr. Stevens spent the entire month of February collecting in the big bend of the Yangtze Kiang, a little north of Likiang in the province of Yunnan. In the latter part of March he entered the province of Szechwan, and after spending the greater part of May at a place called Wushi in the mountains southwest of Tatsienlu, he worked out in various directions from Tatsienlu during June, July and August. He first went south to Ulongkong, then northwest to Kwanchai, and then east and northeast into the Mouping district whence he reached Yachow, and finally Kiating. From this point he ceased active work and descended the Yangtze Kiang River to the coast at Shanghai.

By the division of its personnel into sections, by well-directed effort in particular regions, and by the employment of trained natives to assist in the preparation of specimens, the Kelley-Roosevelts Expedition in a single season brought together a very large



GROUP OF MUSK-OX

Hall of American Mammal Habitat Groups (Hall 16)

Taxidermy by Carl E. Akeley. Reinstallation by Julius Friesser. Background by Charles A. Corwin

About one twenty-second natural size

and important collection. This includes not only the very rare and striking giant panda, but selected examples of large hoofed animals for habitat groups, and a greatly varied collection of the entire vertebrate fauna of a little-known part of the world. The collection of birds is augmented by 920 selected specimens from Siam, obtained through a fortunate purchase from Mr. C. F. Aagard, a resident collector, whose work extended over a period of years. The total number of zoological specimens to be credited to the expedition is 15,397, of which 1,479 are mammals, 5,194 birds, 453 reptiles, 438 fresh-water fishes, and 7,833 insects. In addition there are 2,400 sheets of plants.

The Cornelius Crane Pacific Expedition of Field Museum, sponsored and led by Mr. Cornelius Crane, son of Mr. Richard T. Crane, Jr., Trustee and Benefactor of Field Museum, sailed from Boston November 16, 1928, on Mr. Cornelius Crane's brigantine auxiliary yacht, the *Illyria*. The personnel included three friends of Mr. Crane's, Messrs. Sidney N. Shurtleff, of Boston, Charles R. Peavy, of Mobile, Alabama, and Murry Fairbank, of New York. Mr. Shurtleff served as photographer for the expedition. The scientific staff included Assistant Curator of Reptiles Karl P. Schmidt, of Field Museum, leader of the scientific section; Dr. W. L. Moss, of Harvard University Medical School, physician and anthropologist; Dr. Albert W. Herre, of Stanford University, ichthyologist; Mr. Walter A. Weber, of Field Museum, artist and ornithologist; and Mr. Frank C. Wonder, of Field Museum, taxidermist and field collector of mammals.

The *Illyria's* first stop for collecting was made at Port-au-Prince, Haiti, where the party was cordially received by Brigadier General John H. Russell, High Commissioner of the American Mission. Material aid was given by the members of the Service Technique. While three members of the party collected birds and reptiles in the mountains to the south of Port-au-Prince, at altitudes of 4,000 to 6,000 feet, Dr. Herre, with the aid of the Service Technique, collected fishes from the fresh waters of the Republic.

The expedition reached Panama December 11. While alterations and repairs were being made to the *Illyria* at Balboa, the scientific party spent nearly the entire time at Barro Colorado Island, the research station and wild life reservation maintained by the Institute for Tropical Research in America, and there collected a representation of the rich and varied animal life of the Panama jungle, which is typical of the American tropics.

After a brief visit to Cocos Island, where specimens of the four species constituting the only land birds known to the locality were secured, the expedition sailed to the Galapagos Islands. In this famous group four of the larger islands were visited, and collections of remarkable animals, birds, and reptiles were made by Messrs. Schmidt, Weber, and Wonder, while the rest of the party was engaged in fishing and in photography. Notable among the collections obtained were living specimens of the giant tortoises of Indefatigable Island; complete shells of the tortoise of Charles Island, which has been extinct for nearly a century; specimens of the flightless birds, penguin and cormorant, native to the archipelago; and specimens and studies of the remarkable large lizards, the marine and land iguanas.

The voyage of some 3,000 miles to the Marquesas was made under sail. Two islands, Hiva-oo and Nukahiva, were visited. The scantiness of animal life on these well-watered islands was in notable contrast to its abundance on the arid Galapagos.

En route to Tahiti, two stops were made in the Tuamotu Islands, at Takaroa and at Makatea. The stay at Papeete, the capital of French Oceania, was occupied largely with packing and shipping of specimens. Grateful acknowledgments are due to M. Bouge, the Governor of French Oceania, and to the Vice-Governor of the Marquesas for their cordial reception of the expedition in French territory.

After a brief stop at Bora-bora, the *Illyria* sailed to Suva, Fiji Islands. Two weeks, March 10 to 24, were spent in Fiji, collecting fishes, birds, reptiles, and bats. Much aid was received by the party from Dr. John D. Tothill, Director of Agriculture for the Fiji Islands.

In the New Hebrides, where the expedition stopped from March 27 to April 7, at Malekula, Malo Island, and on the largest of the group, Espiritu Santo, collections of birds, bats, and reptiles were accumulated. Mr. Crane and several members of the party visited the Big Nambas tribe on West Malekula, under the guidance of the British agent, Mr. Adam. The collectors were assisted at Hog Harbor by Mr. W. T. Robertson, a resident.

Upon arrival at the Solomon Islands, hornbills were seen for the first time; parrots with extraordinarily brilliant plumage were abundant; and fruit-bats, already encountered in several species in the New Hebrides, were still more abundant and varied. Reptiles were here supplemented by an abundance of frogs, several

of which were remarkable for curious coloration or other characteristics. One of the most remarkable of the skinoid lizards, the large prehensile-tailed *Corucia*, was secured from natives. Reef fishing was constantly productive, not only of brilliantly colored fishes, but also of the remarkable marine snakes, of which one species was extremely abundant in the Solomons. The itinerary in the Solomons included Ugi, Tulagi, Malaita, Ysabel, Kulambangra, New Georgia, and Shortland Islands. The period from April 10 to April 24 was spent in these islands.

A stop of some days at Rabaul, New Britain, the capital of the territory of New Guinea, enabled the expedition to ship accumulated collections and to prepare for the long sail along the coast of New Guinea. Mr. George Murray, a relative of Captain Selden Boutilier of the *Illyria*, is director of agriculture for the territory, and he was most cordial and helpful during the party's stay in New Britain.

Stops were made on the north coast of New Guinea at Lae in Huon Gulf; Madang and Sek in Astrolabe Bay; on the Sepik River; in Australian territory; and at Manokwari in Dutch New Guinea. The voyage up the Sepik, under the guidance of Father Franz Kirschbaum, of the Catholic Mission of the Society of the Holy Word, was one of the most notable portions of the whole route, both for its view of the interior of New Guinea with its extraordinary animal life, and for the glimpse of the no less remarkable tribes which inhabit its banks. The *Illyria* reached the junction of the May River with the Sepik, a point some 450 miles from the sea. Besides interesting contacts with the diverse cultures of the tribes of the lower, middle, and upper river, visits were made to tribes on the May River which had only once before seen white men—on the visit of a German expedition seventeen years before. A small anthropological collection was made among these people. Collections of birds, mammals, and reptiles were made, chiefly at Marienberg. The collection of fishes made by trade with the natives seems to represent a fauna previously unknown.

Waigeu Island is known to naturalists from descriptions of Wallace and Guillemard. The *Illyria* was anchored in one of its bays from June 4 to June 9. The short stay made general collecting difficult, but notable collections of fishes were made. At Ternate, official visits to the Resident occupied the brief duration of the *Illyria's* stay.

The anchorage chosen for the work of the expedition in Celebes was Lembah Strait, between the small island of Lembah and the tip of the great northern peninsula of the main island. Aided by Malay hunters, the party secured a representation of the remarkable Celebesian fauna, including dwarf buffalo, babirusa, wild pig, deer, monkeys, and a great variety of small game.

The volcanic islands of the chain between Mindanao, southernmost of the Philippines, and the northern peninsula of Celebes, form a series of stepping-stones for the collecting of the marine fishes of the two islands, the relations of which were of special interest to Dr. Herre on account of his eight years of work on the Philippine fishes. The expedition made a stop of two days at Sangir Island, almost midway between Mindanao and Celebes, primarily to collect fishes from the bays and reefs.

The expedition concluded its principal itinerary at Sandakan, British North Borneo, where the *Illyria* arrived on June 27. Mr. Crane, with Dr. Moss and Messrs. Peavy, Fairbank and Shurtleff, returned to the United States after leaving the *Illyria* at Surabaya and making a brief tour of Bali, Java, Siam, and Indo-China. Dr. Herre returned to America later.

Messrs. Schmidt, Weber, and Wonder, after ten days of collecting in the vicinity of Sandakan, proceeded to Zamboanga, where an important addition to the series of plaster molds of fishes for exhibition was made, after which Messrs. Schmidt and Weber returned to the United States via Manila, reaching Chicago September 3. After a further ten days' collecting in Mindanao, Mr. Wonder returned to North Borneo and made important additions to the collections of mammals, birds and reptiles, including specimens and accessories for a group of orang-utan. His work, extending to August 29, concluded the field collecting of the Cornelius Crane Pacific Expedition.

The *Illyria*, with Captain Boutillier and crew, returned to Gloucester, Massachusetts, via the Suez Canal.

The results of the expedition, in specimens collected, amount to 12,000 fishes (estimate); approximately 2,000 reptiles and amphibians; 1,228 birds; and 879 mammals. Some 2,000 invertebrates were collected, including 75 vials of termites, a series more than twice as extensive as any previous collection of termites from the Pacific islands.

Notable elements in the fish collection are the series of new forms from the Sepik River, the brilliantly colored novelties added



RAGWEED (*Ambrosia elatior*)

Hall of Plant Life (Hall 29)

The most abundant of the ragweeds of the Chicago region, and probably the principal source of hay fever pollen

Reproduced in Stanley Field Plant Reproduction Laboratories

One-fourth natural size

to the Philippine fauna, and the series of molds and color notes for use in the preparation of exhibition specimens for Field Museum's new Hall of Fishes.

Among the amphibians and reptiles, the more interesting results of the expedition include observations on the habits of Galapagos reptiles; the collection of specimens of the extinct Charles Island tortoise; the notable series of specimens from the Fiji Islands, Solomon Islands, and New Hebrides; a fine series of the two species of crocodile from New Guinea, amply substantiating Assistant Curator Schmidt's recently described *Crocodilus novae-guineae*; and a representation of the fauna of New Guinea, Celebes, Borneo, and the Philippines hitherto altogether lacking in Field Museum's collections.

The birds brought back by the expedition add numerous genera and species of especially brilliantly colored or otherwise remarkable forms, many of them prepared for exhibition in the Museum's Systematic Bird Hall. The pigeons, cockatoos, lorries, hornbills, and birds of paradise reach their maximum development in the regions visited, some of them being confined to the New Guinean region. The series of paintings and color notes of birds prepared by Mr. Weber in the course of the expedition form a valuable supplement to the collection.

The mammals obtained by the expedition add important genera and species to Field Museum's collection. The collection of bats includes thirty-two species, and the fruit-bats (Megachiroptera) obtained more than double the total representation of this group formerly in Field Museum. An interesting discovery was made on the barren Galapagos of a new species of rodent. This addition to the small but significant mammal fauna of those islands has been named *Nesoryzomys darwini* Osgood, and is described in a Museum publication issued in 1929. Other noteworthy mammals include New Guinean and Celebesian marsupials, monkeys, pigs, deer, the dwarf buffalo of Celebes, and a representation of the lowland fauna of Borneo.

The special equipment carried by the Cornelius Crane Pacific Expedition, including cold storage facilities, diving helmets for undersea observations, and power launches for local transportation, contributed to effective work even in localities where only brief stops were made. The result is a substantial addition to Field Museum's collections both for exhibition and for study.

The Harold White-John Coats Abyssinian Expedition of Field Museum, as stated in the Annual Report for 1928, left New York in October, 1928. This expedition was wholly financed by Captain Harold A. White, of New York, and Major John Coats of Ayrshire, Scotland, both of whom actively participated in the undertaking. In addition to the two principals, the personnel of the expedition included Mr. George E. Carey, Jr., of Baltimore, Maryland, and Mr. C. J. Albrecht, of Field Museum's staff of taxidermists. There were also connected with the party as photographers and associates Messrs. Charles Ohneiser and E. Steineger of Berlin, and M. Hubert of Paris.

The principal members of the expedition left Addis Ababa, the capital of Abyssinia, on December 13, 1928, and proceeded south through the province of Arussi to Mount Kaka, on the slopes of which about a month was spent in general hunting. Later they were met by the others with their main supply caravan of mules and camels at Gatela in the province of Sidamo, a short distance east of the southern end of Lake Abaya.

The chief base camp of the expedition was made south of the Bisan River. From there hunting was carried on westward to the Sagan River near the border of the province of Boran. There, forty-six days in March and April were spent in fulfilling the principal object of the expedition, which was to obtain selected examples of the reticulated giraffe and other large mammals for use in a proposed "water hole" group of African game animals. In this region five fine giraffes, and various specimens of oryx, koodoo, Grant's gazelle, hunting dogs, and one aard-vark were taken.

Later in April the expedition moved south to Mount Kunchorro, finding water very scarce and conditions of travel correspondingly difficult. Thence they turned west and reached the bed of Lake Stephanie but, finding it wholly dry, they turned back at once and made southeastward to Mount Mega in southern Boran, not far from the Kenya border. This region yielded an interesting series of dik diks, including several which are nearly pure white and appear to represent an instance of local albinism which threatens to supersede the normal type of coloration. Three specimens of the rock or mountain reedbuck also were taken on Mount Mega.

In June the expedition moved on to Moyale at the Kenya border, and thence by motor some 600 miles to Nairobi, successfully transporting its accumulation of skins of large mammals to this metropolis and shipping point in first-class condition.

With the especial object of obtaining specimens for a lion group, a month's trip was then made to the Zerengetti Plains in Tanganyika. Here, in a relatively short time, six fine lions including both old and young were obtained, and in addition a good black rhinoceros, two aard-varks, several zebras, and more Grant's gazelles for use in the water hole group.

The expedition finally disbanded in Nairobi, Mr. Albrecht leaving for the United States August 5 and reaching Chicago September 20. Some time later the collections were received in excellent condition. Captain White and Major Coats must be given great credit for carrying through a difficult program, traversing a region largely waterless and subject to restrictions imposed by loosely governed natives. But for the cordial cooperation of Negus Tafari Makonnen of Abyssinia, again graciously accorded a Field Museum expedition, it would have been impossible. The Negus, it will be remembered, generously cooperated also with the Field Museum—*Chicago Daily News* Abyssinian Expedition of 1926–27.

The results of the Harold White–John Coats Expedition provide material for a group of lions, a group of aard-varks and a water hole group, which, as projected, will be the largest habitat group ever produced at Field Museum. This group will include five reticulated giraffes, a black rhinoceros, a herd of eight or ten Grant's gazelles, several zebras, and some smaller animals.

The expedition was not equipped for general collecting of small animals, but concentrated on the group material. Nevertheless, a few small mammals were obtained, and also certain interesting and valuable birds. Among these is a series of the Abyssinian blue goose, a species of restricted range, which is rare in collections. There is also a good representation of the game birds of the francolin group, including one specimen of an entirely unknown species very distinct from those previously described.

The Chancellor–Stuart–Field Museum Expedition to the South Pacific left San Francisco February 20 for New Zealand, Australia, and the East Indies. The expedition consists of Mr. Philip M. Chancellor of Santa Barbara, California, and Mr. Norton Stuart, also of Santa Barbara. Mr. Chancellor, who is financing the expedition, acts as photographer to the expedition. Special equipment for intimate photographic studies of living animals, including a diving bell for undersea work, is carried. Mr. Stuart, who is an

expert technician and museum preparator, is equipped for collecting and, to a certain extent, actually preparing exhibition material in the field.

The object of the Chancellor-Stuart Expedition was to obtain specimens, accessory group material, and careful, first-hand life studies of certain rare and interesting animals, especially reptiles, of which some of the most extraordinary forms now living are found in the Australasian and East Indian regions. Its plans also included some reconnaissance travel for the purpose of making contacts and obtaining preliminary information for use in a second expedition proposed for 1930. At the close of 1929 the expedition had not yet returned, but reports received from it indicated that its main objects had been successfully achieved.

Messrs. Chancellor and Stuart arrived in Wellington, New Zealand, about March 14. On the South Island of New Zealand they obtained by special permission two specimens of the tuatara lizard or *Sphenodon*, one of the most peculiar of living reptiles, very primitive in character and of much zoological interest. Here, also, was secured material for a small group of the flightless bird known as the kiwi.

From New Zealand they crossed to Sydney, Australia, and made a short trip through New South Wales, Victoria, and South Australia for reconnaissance purposes. Returning to Sydney, they sailed to Batavia, Java, which served as headquarters for several months. One of their especial quests was the *waraan* or giant lizard of Komodo Island, a Dutch possession little known and seldom visited.

Messrs. Chancellor and Stuart took up the matter of permission to collect specimens of the Komodo lizard with Mr. Coert du Bois, American Consul-General at Batavia, and through his good offices and those of Dr. K. W. Dammerman, Director of the Zoological Museum at Buitenzorg, they were invited to join a Dutch expedition to Komodo for the purpose of obtaining such specimens as seemed justifiable.

The joint expedition sailed from Batavia October 8, and on November 6 sent the welcome news that two fine specimens of the giant lizard had been secured for Field Museum. One of these is reported to be nine feet in length and the other eight feet ten inches. These specimens with accessories and field notes will provide material for one of the largest and most striking exhibits of the Museum's Hall of Reptiles.

During July and August, while negotiations regarding the Komodo trip were pending, the expedition visited the interior of Sumatra and there obtained two fine specimens of the reticulated python. One of these, a male, measures twenty-four feet ten inches in length and the other, a female, twenty-one feet three inches. With them was collected a clutch of eighty-one python eggs. The reticulated python is the largest of living snakes and is characterized by an intricate and beautiful color pattern, altogether providing a highly desirable creature for museum exhibition.

From Komodo, the expedition returned to Batavia and thence to Australia for further work in that country with the intention of reaching the United States about February 20, 1930. Although the material collected by this expedition has not yet reached Field Museum, the reports of its success are very gratifying. Mr. Chancellor's expressed intention of continuing similar work in the future and of financing not only field work but subsequent preparation of material gives promise of very important contributions to science and education.

The Field Museum-Williamson Undersea Expedition to the Bahamas was carried out during the spring and early summer of 1929. This expedition was for the primary purpose of obtaining material for a series of large groups of fishes in undersea settings for the Museum's projected new Hall of Fishes. The work involved not only the collection of numerous fishes but also of large quantities of corals, sea fans and other delicately formed and beautifully colored undersea life in which the fishes have their habitat.

Mr. J. E. Williamson of New York, well known for his undersea photography and his unique equipment for submarine observations, was engaged for the season with his staff, his floating gear, and his special apparatus. One of Field Museum's taxidermists, Mr. Leon L. Pray, was assigned to work with him during a period of ten weeks.

Mr. Williamson left New York for Nassau on March 15 and was joined by Mr. Pray about April 1. The Governor of the Bahamas cordially afforded them facilities for their work. Headquarters were established at Sandy Cay, a small island near Nassau, which was placed at their disposal by the owner. Here, with a shore camp and various craft near-by, work was prosecuted intensively and very successfully.

By use of the undersea tube, Mr. Pray was enabled to make numerous colored sketches and observations of undisturbed life on

the sea bottom and to design and plan the proposed fish groups with complete fidelity to nature. Meanwhile, with an abundance of local help, fishes of many kinds were taken, cast in plaster, and recorded with detailed color notes. Altogether, 190 casts of fishes were made, ranging from dainty little angel fish to great sharks.

By the use of ingenious methods and special gear for heavy work, corals of very large size and fragile structure were lifted without injury direct from the sea bottom and transported to shore where they were carefully prepared, packed and crated for shipment. One large palmate coral had dimensions of 10'9" x 6' x 4'3" and is perhaps the largest specimen of the kind ever preserved entire. It weighs about two tons.

The material obtained by the expedition to the Bahamas was transported in fifteen large cases to Jacksonville, Florida, where it was delivered to the Illinois Central Railroad which gave it special handling and delivered it in Chicago with everything in excellent condition. It forms the largest shipment of the kind ever received at Field Museum and will fulfill the principal and immediate needs for the Hall of Fishes.

The Thorne-Graves Arctic Expedition was organized and financed by Mr. Bruce Thorne of Chicago and Mr. George Coe Graves II, of New York. Its first purpose was the acquisition of specimens of Pacific walrus for a habitat group in the Museum's Hall of Marine Mammals. A further object was material for a group of Alaskan caribou to fill one of the few remaining spaces in the Hall of American Mammal Habitat Groups.

Messrs. Thorne and Graves chartered the power schooner *Dorothy*, in Seattle, and sent it north early in June with a capable crew. Mr. John Jonas, taxidermist of Yonkers, New York, was engaged and went north on the *Dorothy*. Meanwhile, Messrs. Thorne and Graves proceeded by mail steamer to Anchorage, Alaska, whence they flew by airplane to Nome. There they embarked on the *Dorothy* and sailed for the Arctic on July 3. Two Eskimos were taken aboard at the Diomed Islands and the ship then continued to the edge of the Arctic ice pack. Ice conditions were very severe and it was necessary to work near the Siberian coast. Most of the time was spent in the vicinity of Koliuchin Island, scarcely twenty miles from the Asiatic shore, at about longitude 175° west.

Walrus were found in abundance and seven selected specimens were taken and preserved for the Museum's group. Several

polar bears also were killed. This was done during some rather hazardous cruising among the ice floes. At one time the *Dorothy* was fast in the ice, unable to move an inch, and at another her rudder was broken by submerged ice, necessitating a difficult return to Nome for repairs.

On July 28 the expedition crossed the Arctic Circle on its return journey and seven days later landed at Seward. Here Messrs. Thorne and Graves left Mr. Jonas to continue with the ship to Seattle, bringing the specimens secured in the Arctic. They then started at once with pack horses for the Talkeetna District for the fall hunting of caribou and other game. Finding caribou with horns still in the "velvet" and unsuitable for the Museum's use, they engaged local hunters to secure the needed specimens at a later date when in proper condition. On September 27 they sailed for Seattle, and somewhat later five specimens of caribou, well prepared in accordance with their instructions, were received by Field Museum.

The prompt, energetic, and businesslike way in which Messrs. Thorne and Graves undertook and successfully carried out their expedition entitles them to great credit. Since their return, Mr. Thorne has cooperated further with the Museum by consultation with the Staff regarding plans for the preparation of their material and, in the case of the walrus group, contributions from Mr. Thorne, Mr. Henry Graves, Jr., and Mr. George Coe Graves II, will insure its completion in the near future, probably before the end of 1930.

While large expeditions were afield at distant points, Mr. Ashley Hine, bird taxidermist of the Museum, spent some weeks in Arizona collecting birds especially needed for systematic exhibits now under way. He left Chicago April 2 and continued in Arizona until June 5. Dr. Alfred Lewy of Chicago voluntarily assisted him from April 17 to May 5. One month was spent near Tucson where a base was established from which short trips were made to the Papago Indian Reservation and the Santa Catalina Mountains. From May 5 to May 23 work was done in Carr, Ramsey, and Miller Canyons in the Huachuca Mountains, at altitudes ranging up to 9,300 feet. A total of 323 specimens of birds was obtained.

In the latter part of 1929 an important zoological expedition for 1930 was organized under the patronage of Mr. Arthur S. Vernay of New York. This is called the Vernay-Lang Kalahari

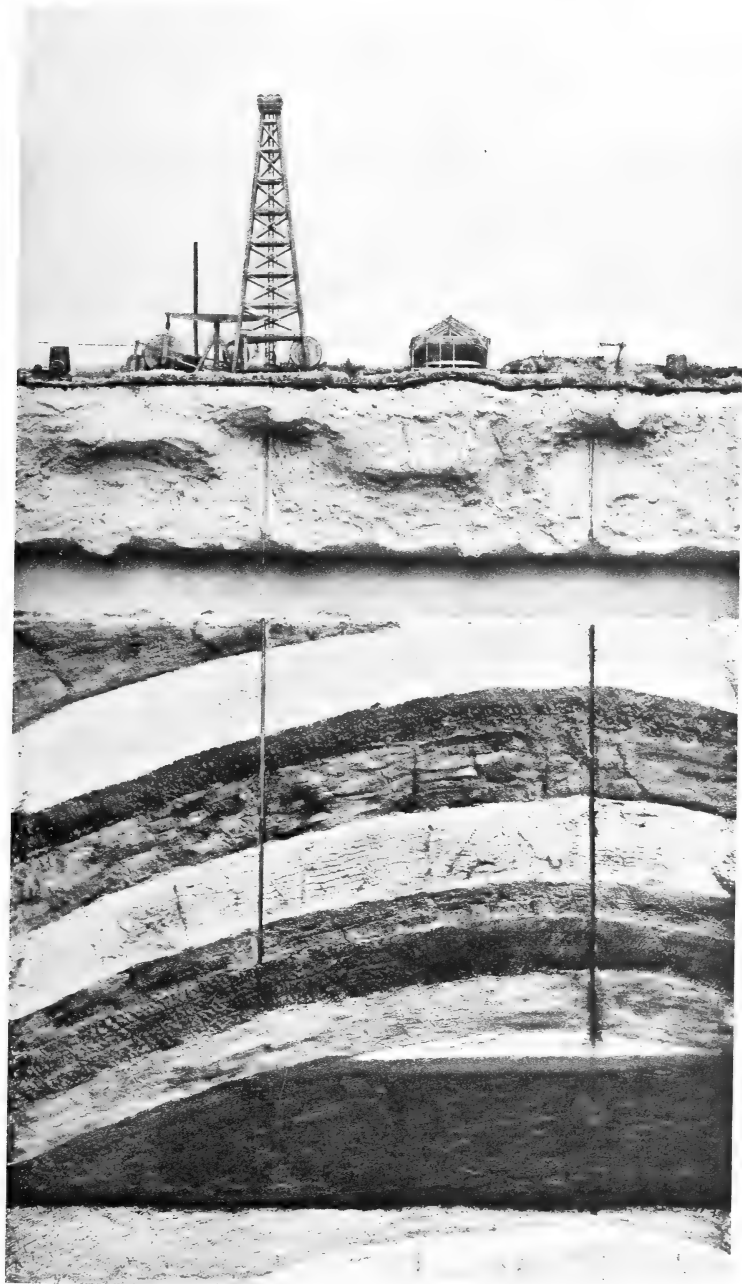
Expedition of Field Museum and will have the personal leadership of Mr. Vernay. The expedition will be accompanied by two well-qualified naturalists and collectors, Mr. Herbert Lang, well known for his very successful Congo expedition for the American Museum of Natural History, and Mr. W. Rudyerd Boulton, of the Carnegie Museum, who was associated with Mr. Vernay on a previous expedition in Angola. A further assurance of the success of the expedition is the expressed intention of the Imperial Secretary of British South Africa, the Honorable Captain B. E. H. Clifford, to accompany it part of the time. The expedition also expects to meet Mr. Allan Chapman, who will cooperate in the work in Angola.

Mr. Vernay sailed from New York on December 27 for London, whence he will continue in February to Capetown. From there he will proceed north by rail to Francistown, where he will meet the other members and start westward by motor caravan. It is proposed to visit British Bechuanaland, principally the region of the Botletle River and Lake Ngami, the northern part of the Kalahari Desert and, if conditions are favorable, to continue to the west coast through Angola.

The expedition will carry full equipment for collecting vertebrates of all kinds, and a large general collection is to be expected as well as certain special animals for Museum exhibits. In Angola, by special permission of the Portuguese government, an effort will be made to secure specimens of the giant sable antelope for a habitat group to be placed in Carl E. Akeley Memorial Hall. This species, which has a restricted range and is rare in collections, is regarded by many as the finest of all the antelope tribe. The Museum is greatly indebted to Portuguese officials for their cordial assistance.

The following list indicates the various expeditions and other field work conducted during 1929 for all Departments of the Museum:

LOCALITY	COLLECTORS	MATERIAL
KISH, MESOPOTAMIA . . . (Seventh season)	Stephen Langdon L. C. Watelin René Watelin T. K. Penniman	Archaeological collections
WEST AFRICA	W. D. Hambly	Ethnological collections
BRITISH HONDURAS	J. Eric Thompson	Archaeological and ethno- logical collections
BRAZIL AND PERU	B. E. Dahlgren Llewelyn Williams Emil Sella	Botanical collections
PERU	August Weberbauer	Botanical collections



MODEL OF OIL WELL

The strata are shown as they occur at Lawrenceville, Illinois

Constructed by H. W. Nichols and Valerie Legault

Scale of model, five feet to the inch

EUROPE.....	J. Francis Macbride	Photographing botanical type specimens
NEW MEXICO.....	Henry W. Nichols	Geological collections
INDIANA.....	Elmer S. Riggs P. C. Orr	Paleontological collections
SOUTHEASTERN ASIA...	Colonel Theodore Roosevelt, and Kermit Roosevelt (joint leaders) Harold Coolidge, Jr.* C. Suydam Cutting Herbert Stevens Josselyn Van Tyne Russell W. Hendee Ralph E. Wheeler	Zoological, botanical and ethnological collections
PACIFIC ISLANDS AND EAST INDIES.....	Cornelius Crane Karl P. Schmidt** Albert W. Herre W. L. Moss Walter A. Weber Frank C. Wonder Sidney N. Shurtleff Murry Fairbank Charles R. Peavy	Zoological and ethnological collections
ABYSSINIA, KENYA COLONY, AND TANGANYIKA....	Captain Harold A. White, and Major John Coats (joint leaders) C. J. Albrecht George E. Carey, Jr.	Zoological collections
INDIA.....	Colonel J. C. Faunthorpe	Zoological collections
NEW ZEALAND, AUSTRALIA, AND EAST INDIES....	Philip M. Chancellor Norton Stuart	Zoological collections
ARCTIC OCEAN AND ALASKA.....	Bruce Thorne, and George Coe Graves II (joint leaders) John Jonas	Zoological collections
BAHAMA ISLANDS.....	J. E. Williamson Leon L. Pray	Zoological collections
ARIZONA.....	Ashley Hine	Ornithological collections
CANADA.....	Julius Friesser Arthur G. Rueckert	Arctic plants

Leader of expedition named first in each case.

*Leader, second contingent.

**Leader, scientific section.

ACCESSIONS

ANTHROPOLOGY.—Accessions received and recorded during the year by the Department of Anthropology amount to fifty-four. Of these thirty-six are by gift, seven as the result of expeditions,

three by exchange, and eight by purchase. These accessions aggregate a total of more than 3,700 objects.

The collections made by Assistant Curator J. Eric Thompson as leader of the Second Marshall Field Archaeological Expedition to British Honduras, consist of some 350 archaeological and ethnological objects obtained in British Honduras and Guatemala.

Some 200 archaeological objects were obtained in the excavations carried out at the sites of Tzimin Cax, Cahal Pichic, and Hatzcap Ceel in western British Honduras (see page 47). Of these three sites Tzimin Cax proved to be the most interesting as well as the richest. It is not a real Maya city as the word is understood, for it does not consist of a series of temples placed on the tops of high mounds gathered around a ceremonial court, but of a number of small, scattered courts perched on the tops of natural hillocks. Around these courts are grouped small mounds, which in many cases contain burials.

These burials, together with other material found, can be grouped into three periods. The latest belongs to the so-called Holmul 5 type, and dates from around the close of the Maya Old Empire (about A.D. 800). The pottery of this period is badly fired and of poor quality, but is elaborately painted, and was made in a large number of different shapes. Of these the commonest are ring-based plates and tall, cylindrical jars. A large number of objects of this culture was found, but unfortunately most of the paint had disappeared from the pottery owing to the dampness and chemical reactions from roots which they endured for centuries. Several of the buried chiefs had their teeth filed to points or inlaid with iron pyrites. Prior to this occupation the site was probably abandoned for a considerable period.

The next earliest occupation is represented by fine, well-made pottery, but usually unpainted. The most typical range of vessels is formed by tetrapods, the legs of which in many cases are in the shape of female breasts. In one case this earlier culture was found in a burial directly below that of the Holmul 5 period, thereby confirming its greater age. At that period jade was carved into ear-plugs and tubular breast-ornaments. One of the vessels of that period now in the Museum is unique. This is a low bowl with four small feet. In the center of the bowl squats a frog of naturalistic style, originally painted blue.

A yet earlier culture, which might conveniently be termed pre-Maya, has also been located. This culture was first discovered last

year at the site of Uaxactun in the Peten by Mr. O. G. Ricketson of the Carnegie Institution. Uaxactun, judging from the sculptured monuments, is the earliest known Maya site, and these pottery types appear to antedate the earliest monument. Mr. Thompson found the same culture under the floors of these little courts just above bed-rock. The ware is well made, and is distinguished by a rippled surface effect. One large bowl, which was found practically complete, in all probability belongs to that culture. If this should really be the case, this vessel will be the only complete pre-Maya vessel in the world.

The sites of Hatzcap Ceel and Cahal Pichic yielded a number of votive offerings of jade, wrought shell, and in one instance a mirror, the face of which consists of iron pyrites cut into small squares.

The ethnological material collected illustrates the present culture of the Mopan Mayas of southern British Honduras, as well as that of the Quiche and Cakchiquel tribes of southern Guatemala. The Mopan Mayas have lost a great deal of their old artistic skill, but the Highland tribes still weave very beautiful cotton cloth. Practically every village in the highlands of Guatemala has its distinctive dress, the women wearing gaily embroidered cotton blouses. A large collection of these was obtained for the Museum, as well as men's costumes, blankets, and shawls.

Through the good offices of Mr. W. A. Newcombe of the Provincial Museum, Victoria, B.C., a son of the late Dr. C. F. Newcombe who did so much in building up the Museum's north-west coast material, a part of the Merrill collection of prehistoric artifacts from Illinois, gathered in 1877, was acquired through purchase. The accession comprises thirty pieces from Calhoun, Greene, Sangamon, Schuyler and Scott counties, and consists of plummets, celts, and other problematical stones of hematite; pendants and banner stones of banded slate; a discoidal of granite; arrowheads and drills of chert; and two small, but beautiful specimens of shell-tempered pottery. The last-named are from mound-graves. Such perfect pieces of pottery are rare, and make a valuable addition to the Museum's archaeological material from the middle west.

The Museum has also secured as a gift from Mr. Frank Vondrasek of Cicero, Illinois, twenty-three excellent quartz arrowheads from Magnet Cove, Arkansas. These specimens range in length from about one-half inch to three inches, and are delicately chipped from rose

and pearl colored chalcedony. They include three types—those with convex bases, those with flat stems or bases, and those with notched bases.

Mr. Homer E. Sargent, of Pasadena, California, added forty-six California baskets to his former gifts of American basketry. All are of superior workmanship and fine quality, and are old productions of a type no longer made.

An otter skin medicine bag decorated with beadwork designs, from the Potawatomi of northern Wisconsin, was presented by Mrs. Lynden Evans of Evanston, Illinois. An otter skin used for medicine by the same tribe was acquired through purchase. A Winnebago necklace of grizzly bear claws and a Haida chief's coat of ermine were also purchased.

Dr. John Kercher, of Chicago, presented a small number of interesting Eskimo articles, among these a wooden mask and models of a kayak and a sledge, from the Golovnin Bay District, Alaska. Several Eskimo objects from Angmagsalik, on the east coast of Greenland, are the gift of Erich Hansen of Chicago, who had formerly accompanied one of the Danish exploring expeditions to Greenland; he also placed at the Museum's disposal a number of good photographs taken by him on this journey, for reproduction.

From the Cornelius Crane Pacific Expedition of Field Museum, working primarily in the interests of the Department of Zoology, were received eight objects, including a very large, finely painted tapa screen from Fiji and seven ornaments from the Sepik River in New Guinea. Four of these are egret feather hair ornaments; the other three are peculiar ornaments having as their most conspicuous feature the large beak of a hornbill.

Ten articles from the upper Sepik and May Rivers, New Guinea, were presented by Assistant Curator Karl P. Schmidt, Department of Zoology, who was a member of the Crane Expedition. There are three nicely ornamented tops used as toys, an incised coconut cup, a decorated lime gourd with carved bone spatula, a plaited and a bamboo puberty cover, a tobacco pipe made of a long, curved gourd, a spear with a pointed bamboo head, and a peculiar double-pointed weapon about seven feet long.

All this New Guinea material is different from any previously received by the Museum, and is therefore a welcome addition.

A collection of stone implements found in kitchen middens near Sydney, Australia, was secured through an exchange with Mr. Keith Kennedy of Sydney, Australia.



LIFE-SIZE FIGURE OF DYAK HUNTER, BORNEO
(Hall G)

The Arthur B. Jones Expedition to Malaysia, 1922-23
Modeling by John G. Prasuhn

The William V. Kelley-Roosevelts Expedition to Eastern Asia, although principally a zoological expedition, resulted in an interesting acquisition for this Department. Mr. Harold J. Coolidge, Jr., of Boston, leader of the second contingent of this expedition, brought back from Indo-China four attractive women's dresses, two from the White Tai of Tonkin and two from the Phunoi and Khakho tribes in northern Laos. The two latter are complete with head-dresses and jewelry and will lend themselves to a picturesque exhibit. The present acquisition is especially appreciated because the very interesting and complex ethnology of this entire region is not yet represented in the Museum.

Two mortuary Chinese clay figures of horsewomen engaged in a game of polo (Plate XVIII) are a notable contribution from Mr. Earle H. Reynolds of Chicago. Technically they differ from most clay figures interred with the dead under the T'ang dynasty (A.D. 618-906). These, in general, are hollow, being made from molds, which accounts for the fact that thousands of the same type have survived. The polo figures in question, however, are solid and freely modeled by hand with great artistic skill. They are delicately painted in colors and distinguished by their excellent expression of motion and dramatic action. The game of polo was introduced into China from Central Asia in the beginning of the seventh century and was a favorite pastime of the emperors of the illustrious T'ang dynasty. The game was eagerly played also by both men and women of high rank. Polo has had a long and honorable history in China, and has been a favorite subject of many great painters. These T'ang clay figures are the earliest representations of the game now in existence.

Dr. I. W. Drummond of New York, well-known collector of jade and amber and for many years a friend of the Museum, presented three important objects. A small vase skilfully carved from pudding-stone and decorated on the sides with tiger heads holding rings in their jaws is a rare work of the K'ien-lung period (1736-95). The two other objects are hornbill carvings: one is a girdle buckle decorated in openwork with the eight Buddhistic emblems of luck; the other is a complete beak of the helmeted hornbill (*Rhinoplax vigil*) carved with an elaborate scene representing the visit of an emperor to the fairy of the moon. It contains six figures, a double-roofed pavilion, and trees and birds, of exquisite workmanship. This carving was immediately placed on exhibition in Hall 32.

The head of a Bodhisatva of the T'ang dynasty (A.D. 618-906), modeled in black lacquer, was presented by Mr. Herbert J.

Devine of New York. Examples of this typically Chinese technique, commonly known as "dry lacquer," are exceedingly rare, and only a few have come to this country. The head in question, detached from a life-size statue, is beautifully modeled in harmony with the best style of T'ang marble sculpture, and as the first example of lacquer sculpture in the Museum is a most welcome addition to the Chinese section.

The collection of archaic Chinese jades was signally enriched by a small, but very important object presented by Mr. J. A. Möller of New York. This is a spike of white jade delicately carved all around into a human figure of archaic style, which belongs to the Chou period (about 500 B.C.). Human figures from that period are exceedingly rare, and this specimen is unique and valuable.

The framework of a Japanese wooden saddle, elegantly lacquered in black and gold, is a gift of Colonel A. A. Sprague of Chicago. It is decorated with two crests, each consisting of three hollyhock leaves, which are the coat of arms of the renowned Tokugawa family. An incised inscription discloses the name of the maker, Yasuyuki, and the date, which is the first year of the period Meiji, corresponding to our year 1868.

A ceremonial battledore from Japan is a gift from Mr. and Mrs. S. Yamagata of Chicago. This is a most artistic object of unusual interest. A battledore like this one was a favorite New Year's gift among the wealthy. It is carved from a white wood, and on one side it is adorned with the portrait of Ichickawa Sadonji, a popular actor, with sword in hand, formed by gold brocade and colored silks. On the other side is a symbolic painting expressive of good wishes, set off from a gold-speckled ground.

Seventy-two packages containing neolithic stone implements found in the Gobi Desert were received from the Central Asiatic Expedition of the American Museum of Natural History, New York, under the leadership of Dr. Roy Chapman Andrews. Field Museum contributed to the financing of this expedition.

An interesting screen of felt decorated with painted appliqué designs of cotton was presented by Mr. Julian Armstrong of Chicago. It was presumably made in India, or possibly in Burma, and may originally have served as the door of a tent. The appliqué work consists of human figures and sprays of leaves as well as panels showing altars with bowls and umbrellas (an emblem of regal power) and a man astride an elephant.

Mrs. John Alden Carpenter of Chicago presented two marionettes used in the puppet plays of Persia. The heads are carved from wood and lacquered. One represents an Armenian priest with tall, black hat and long beard, clad in a black cotton gown with an inset of gold brocade, and equipped with satin shoes. The other figure is a Persian soldier with a black cap on which a lion, the emblem of Persia, is painted. The interesting point is that these marionettes are manipulated from threads or strings attached to the top, and this technique is the oldest form of puppets attested for ancient Greece, India, and China.

A rich harvest has been gathered this year as the result of the excavations at Kish. The more important objects have been unpacked and properly treated. Repairs and restorations have been made whenever necessary. Many stone jars of fine workmanship, as well as several painted pottery jars, have been restored. After one of the rein-rings from the front of a four-wheeled chariot had been cleaned, the figure of an animal surmounting it was found to be a stag with large antlers. There is a fragment of pottery from Jemdet Nasr with a similar animal of the deer family painted on it. Other objects of unusual interest are a copper dagger with decorated handle, the model of a chariot described on page 52, a large saw with copper blade, stone and copper vessels, numerous pieces of pottery, and clay tablets. A beautiful alabaster jar and also a stone bowl which were found had been broken in ancient times and riveted together. One of the rivets has been analyzed by Associate Curator Nichols, who reports that it consists of pure lead with a white lead corrosion on the surface. It is an interesting coincidence that this is the same method of repair employed by the Chinese in mending porcelain. From a scientific standpoint the flint implements from the lowest strata of Kish are the most important objects secured, presenting as they do types previously unknown from Mesopotamia.

Mr. H. W. Seton-Karr of London contributed fifty-eight paleolithic and neolithic knives, scrapers, arrowheads, and other prehistoric implements from England, Belgium, Egypt, India, and Ceylon. Flint flakes from the North Arabian Desert were presented by Dr. E. W. Andrau of The Hague, Holland; Mr. S. W. Quarrie of Royston, Herts, England; and Captain L. W. B. Rees of London.

An excellent collection of painted pebbles from Mas d'Azil, France, was purchased from Professor Henri Breuil of Paris. On these pebbles are designs, partially of a geometric and partially of a

realistic style, which were painted with red ochre by prehistoric men. This is the largest collection of Azilian painted pebbles outside the National Collection of France. The courtesy and friendly cooperation of Professor Breuil and the French Ministry of Beaux-Arts, which allowed this important collection to go to Field Museum, are much appreciated.

A valuable collection of stone and antler implements and pottery sherds from the Swiss lake dwellings was acquired by purchase from Dr. Paul Vouga of the Musée d'Histoire, Neuchatel, Switzerland, who recovered them from Lake Neuchatel. This material makes a good supplement to the excellent collection of Swiss lake dwellers' antiquities previously presented to the Museum by Mr. Martin A. Ryerson.

The Department of Human Anatomy of Oxford University presented several casts of bones which will form the basis for a reconstruction of a Neanderthal child from Gibraltar. The cast of a famous female figurine, known as "Venus," of the Lespuge-Aurignacian period, was received as a gift from Count de St. Périer of Morigny, France, discoverer of the figurine. A plaster impression of a Magdalenian footprint found in a cave of Montespan, together with a plan of this cave drawn to scale, is the gift of M. Felix Trombe, Gauties-les-Bains, France. Copies of prehistoric sketches of animals engraved on the walls of the same cave were presented by M. Georges Debuc of the same place.

The first installment of the material collected by Assistant Curator Hambly as leader of the Frederick H. Rawson-Field Museum Ethnological Expedition to West Africa was received toward the middle of December. The collection includes some fine old wood carvings, large decorated gourds, weapons, implements, musical instruments, smoking utensils, baskets, mats, ornaments, and other ethnographical material illustrating the life and culture of the Ovimbundu in Portuguese Angola.

A small but interesting collection from Sierra Leone, West Africa, was presented by Mrs. William G. Burt of Old Lyme, Connecticut. The collection, made by her father in 1901, includes two wooden masks, decorated gourds, carved wooden paddles, straw hats, leather sandals, a grass skirt, a bow, spears, swords, a pouch, and a stool.

BOTANY.—During 1929 the Department of Botany received 40,996 specimens, more than twice as many as were received in

1928. The number of accessions was 412, representing more than 175 individuals and organizations. Of the specimens acquired, 1,321 were samples and exhibition material of woods, 374 represented miscellaneous economic material for exhibition purposes or for the study series, and the remainder, 39,301 specimens, were herbarium specimens, photographic prints of plants, and negatives of type specimens.

Of these 40,996 specimens 12,974 were presented by correspondents of the Museum, 7,326 were received in exchange, 4,710 were purchased, and 15,986 were received as the result of Museum expeditions.

Of the gifts to the Herbarium during the year the most important is the private herbarium of the late well-known ornithologist Robert Ridgway of Olney, Illinois, received by bequest. In addition to his zoological work, he always maintained a deep interest in plant life, especially that of Richland County, Illinois, with which he was thoroughly familiar. His herbarium, of approximately 4,000 specimens, forms a valuable addition to the Illinois Herbarium of Field Museum, since it contains an approximately complete representation of the flora of Richland County, botanically one of the most interesting portions of the state of Illinois.

The United States has been well represented among the accessions of the year. Professor A. O. Garrett of Salt Lake City, Utah, forwarded 700 plants, chiefly from Utah, a state but imperfectly represented in the Museum's Herbarium. Witte Memorial Museum of San Antonio, Texas, transmitted 392 specimens of plants, chiefly from the arid regions of western Texas, through the interest of Mrs. Ellen Schulz Quillin, Curator of the museum, whose volumes upon Texas plants contain interesting information regarding a little-known flora. Father I. Chateau of Mission, Texas, forwarded thirty-seven plants from the same state.

Mr. H. C. Benke of Chicago, who in past years has been so active in contributing material from the Mississippi Valley states, especially from Illinois, donated this year 517 sheets of herbarium material, largely from New Mexico, Texas, and Kansas, with some interesting specimens for the Illinois Herbarium. His donation included also 140 packets of seeds, chiefly from Illinois and Indiana.

The Misses Sophia and Mary Bremer of Crown Point, Indiana, presented twenty specimens of Indiana plants, including material of several interesting forms new to the Herbarium, and also eighteen packets of seeds of Indiana wild flowers.

Miss Nellie V. Haynie, of Oak Park, Illinois, visited the Herbarium several times during the year to determine plants of her own collections, and she contributed thirteen specimens from Illinois and Colorado, among them the type specimen of a new color form of a wild strawberry found at Waukegan, Illinois.

Mr. G. Eifrig of River Forest, Illinois, continued his donations of previous years, presenting fifty-six specimens from the north-central and southern United States. Professor L. A. Kenoyer of Kalamazoo, Michigan, forwarded 150 specimens of plants from the vicinity of Kalamazoo, among them a large number of grasses and sedges. Mr. E. L. Moseley of Bowling Green, Ohio, contributed a representative series containing 196 plants of northern Ohio, and from Oberlin College, Oberlin, Ohio, there were received 480 specimens, chiefly plants of California and other western states. Miss Ella M. Martin of Greensboro, North Carolina, presented to Field Museum fifty-nine sheets of North Carolina plants.

A special effort was made during 1929 to procure material of the mosses and other cryptogams of the local flora. Mr. G. L. Wittrock, of Chicago, collected and presented 121 specimens of Illinois mosses. Associate Curator Standley, and Mr. Arnold Doubleday, of Chicago, collected for the Herbarium 891 specimens of mosses and other plants in Illinois and Indiana, and 289 packets of wild flower seeds, to be used for exchange and propagation purposes. Mr. Standley and Assistant Curator Macbride jointly collected and donated 105 specimens of mosses and other cryptogams from Indiana. The moss herbarium was further enriched by a valuable lot of seventy-five Arizona mosses, presented by the collector, Mr. Edwin B. Bartram of Bushkill, Pennsylvania.

Of miscellaneous collections there deserve mention three specimens of cycads, presented by the Garfield Park Conservatory, through Mr. August Koch, chief florist, who always has been generous in supplying Field Museum with material of unusual plants which flower in that justly famous collection. Dr. C. R. Ball of Washington, D.C., contributed twelve specimens of willows of the United States, particularly valuable because of the critical determinations which accompanied them. Dr. J. C. Chamberlain, of the University of Chicago, presented two specimens of rare cycads, a group in which he stands pre-eminent as an authority.

Dr. C. E. Hellmayr of Field Museum made a welcome gift of fourteen specimens of European orchids, useful for purposes of comparison with related American forms. Dr. E. E. Sherff con-

tinued to place in the Herbarium material of desirable Compositae, particularly of the genus *Bidens*, and during 1929 contributed thirty-three specimens. Mr. Eric Walther, of San Francisco, forwarded ample material of a handsome Mexican cycad, apparently representing a new species of the genus *Ceratozamia*, grown in the conservatories of Golden Gate Park. Professor W. S. Cooper, of the University of Minnesota, presented a series of 349 plants which he had collected in Alaska and British Columbia. His collection, when named, was found to contain an orchid (*Cypripedium*) new to the Alaskan flora, and an unnamed albino form of a *Hedysarum*.

From Mexico and Central America there was acquired by gift a large amount of interesting and exceptionally valuable herbarium material. There were received from Mr. William A. Schipp of Belize, British Honduras, 466 specimens of British Honduras plants. These were determined by Associate Curator Standley, who found among them numerous new species of which descriptions have been prepared for publication, and representatives of several noteworthy species hitherto absent from the Herbarium of Field Museum. Mr. Schipp's collections included many records of genera and species new to Central America, and of some unreported even for the North American continent. Another important collection from British Honduras, presented by Mr. C. L. Lundell, of New York, consisted of 210 specimens, several of which represented new species. Mr. Lundell's plants were collected in the extreme northern part of the colony, in connection with his work upon the latex-yielding plants of the region. The British Honduras material thus received is of particular value for comparison with collections from near-by Yucatan, in which Field Museum Herbarium is unequaled. Many of the British Honduras species found in these recent collections were known previously only from Yucatan. Besides the accessions mentioned, Mr. Neil Stevenson, of Belize, forwarded five specimens illustrating the palms of British Honduras.

From Guatemala there were received from the Dirección General de Agricultura 189 very desirable plants characteristic of the flora of that republic. Dr. Salvador Calderón of the laboratories of the Department of Agriculture, San Salvador, Salvador, has continued to collect, with his usual enthusiasm and persistence, the rarer plants of that country, and presented Field Museum with 238 specimens of plants, many of which were new to science or additions to the recorded flora of Salvador.

Dr. C. A. Purpus of Zacuapam, Veracruz, Mexico, veteran collector of Mexican plants, visited certain exceptionally rich regions of Veracruz during 1929, and sent to the Herbarium 443 specimens. Although the flora of that state has been investigated by many collectors during the past 150 years, Dr. Purpus' recent collections contain representatives of several plants quite unknown to science. The Dirección de Estudios Biológicos of the Mexican government, through its director, Professor A. L. Herrera, presented samples of *Ochroma* fiber from Mexico, this being the product of the tree yielding balsa wood of commerce, which is lighter than cork. Professor Maximino Martínez, of Mexico City, contributed during the year fifteen specimens of the less common Mexican plants.

From the School of Forestry of Yale University, New Haven, Connecticut, there were received, through the interest of Professor Samuel J. Record, Research Associate in Wood Technology of Field Museum, 183 specimens, mainly of tropical American plants. Most of these represented tree species whose wood has been studied by Professor Record. Several of them were discovered to represent trees heretofore unknown botanically, and descriptions of them have been published in *Tropical Woods*.

From Honduras there were received 101 specimens of trees transmitted by Dr. Wilson Popenoe, Director of the Lancetilla Experiment Station of the Tela Railroad Company. This collection supplements one made in the same region in 1927-28 by Associate Curator Standley, and it contains several species which he did not find in the course of his work in the area. Dr. Holger Johansen of La Lima, Honduras, forwarded fifty-two specimens of plants from the region in which he lives, and these, likewise, proved to contain several species of more than casual interest.

Of Nicaraguan plants there were received fifty-six specimens, collected by Rev. E. E. Schramm of Cabo Gracias a Dios, whose mission station is situated on the banks of the Wanks River, a week's journey by gasoline launch upward from the mouth of the river, in a wild region quite unknown botanically.

The most important single Central American collection received by the Museum in 1929 consisted of 668 specimens of Costa Rican plants, collected and presented by Professor H. E. Stork of Carleton College, Northfield, Minnesota. Professor Stork had collected in earlier years in Costa Rica and Panama, but his collections of 1929 have proved even more interesting than previous ones. They have

not yet been fully identified, but it is evident that they contain numerous species not detected heretofore in the Costa Rican flora.

Mr. C. H. Lankester, of Cartago, well-known collector of Costa Rican orchids, birds, and butterflies, presented seventeen specimens of unusual Costa Rican plants. Mr. Ferdinand Nevermann of San José, Costa Rica, who has made a name for himself in the entomological world by his studies and collections of Costa Rican beetles, sent to the Herbarium ten specimens of fungi.

From Panama there were received 251 specimens of plants collected in the Canal Zone by Mr. S. W. Frost of Pennsylvania State College, Arendtsville, Pennsylvania. These were obtained on Barro Colorado Island, in Gatun Lake in the Panama Canal, where is located the laboratory of the Institute for Tropical Research, directed with such signal success in recent years by Mr. James Zetek. Several of Mr. Frost's plants proved to be additions to the known flora of Barro Colorado Island, of which two lists have been published by Associate Curator Standley, the second of which, prepared in association with Professor L. A. Kenoyer, appeared in Volume IV of the Botanical Series of Field Museum. Mr. R. H. Wetmore of the Botanical Museum of Harvard University, Cambridge, Massachusetts, presented an equally interesting series of seventy-seven specimens, collected on the same island, and containing other new records for the Barro Colorado flora.

The Museum's already very extensive collection of Peruvian plants has received several notable additions during 1929. Professor Fortunato L. Herrera of Cuzco, Peru, generously contributed a collection of 551 specimens, chiefly from the Department of Cuzco. The collection is an especially helpful one, since it comes from a region scarcely represented previously in the Museum collections, and it will, therefore, be valuable for citation in the flora of Peru, now in course of preparation by Assistant Curator Macbride. Mr. Oscar L. Haught of Negritos, Peru, presented a carefully selected series of 259 specimens, illustrating the flora of an arid region of Peru little known botanically. Still another important collection of Peruvian plants was received during the year. It consisted of 206 specimens gathered by Mr. M. Sawada, and was received from Professor R. Kanehira of Fuoka, Japan. Although not yet fully determined, it is evident that the collection contains a large number of plants of species not expected from Peru.

A fine Brazilian collection, consisting of eighty-one uncommonly well-prepared specimens from the state of Pará, was presented by Mr. Emilio Kauffmann of Belem, Brazil.

In 1929 the Museum received by exchange from various botanical institutions and from individuals more than 7,300 herbarium specimens, including much material of great value.

From the Arnold Arboretum, Jamaica Plain, Massachusetts, there were acquired 785 specimens. Part of these represented critical forms of the trees of the United States. There were also 285 specimens of plants collected on Barro Colorado Island, Canal Zone, by Mr. W. N. Bangham. This collection, like the others already mentioned from that island, contained various further additions to the published flora of Barro Colorado. It may be observed that an unusual amount of botanical exploration has been conducted there during the past year. The Arnold Arboretum material included more than 100 specimens of plants obtained in northern Yucatan in the summer of 1929 by Dr. J. Becquaert. These are noteworthy as forming the only Yucatan collection obtained in many years, and among them were found three new species, from an area which had been believed to have been rather thoroughly explored. The Becquaert series makes a much appreciated addition to Field Museum's unique representation of the flora of the Yucatan Peninsula.

The Botanical Garden and Museum of Berlin very generously transmitted fifty specimens of plants, mostly Leguminosae, from Peru. Since most of these represent type material of Peruvian species, they will be invaluable for use in the preparation of the flora of Peru.

The Botaniska Institutionen of Upsala, Sweden, sent in exchange 450 specimens from the classical series procured in Brazil by Regnell, which will be found helpful in the determination of the collections made by the Museum's expeditions to that country. The British Museum (Natural History), London, through the courtesy of Dr. A. B. Rendle, sent 1,034 specimens, mostly from early Chilean collections, with some material from other South American regions.

The Farlow Herbarium of Harvard University, Cambridge, Massachusetts, contributed 141 specimens of interesting and carefully determined cryptogamic plants. The Gray Herbarium of Harvard University continued its exchanges with ninety-two specimens, which included a valuable series from the north coast of

Honduras, and critical species of bromeliads. From Mr. Ludlow Griscom of Cambridge, Massachusetts, there were received 119 specimens of plants, chiefly native to the United States.

The Jardin Botanique de l'Etat, Brussels, Belgium, transmitted in exchange 200 specimens of tropical American plants. From the Jardin Botanique Principal, of Leningrad, Union of Socialistic Soviet Republics, were received 130 specimens of plants collected in Mexico, Colombia, and Venezuela by Dr. Georges Woronow. This material consisted largely of Rubiaceae, and was determined in Field Museum by Associate Curator Standley.

The Natural History Museum of Vienna, Austria, forwarded in exchange a valuable series of 671 European plants, many of them from classic series obtained by early collectors. The Royal Natural History Museum of Stockholm, Sweden, through Dr. Gunnar Samuelsson, sent 257 plants from tropical America. Most of these were obtained in Cuba by the eminent collector, Dr. Erik L. Ekman, of Haiti, and they include duplicate types of many endemic species described by Dr. Ignatius Urban of Berlin.

The New York Botanical Garden transmitted ninety-four specimens, mostly from tropical America. From Pomona College, Claremont, California, there were sent by Professor Philip A. Munz 915 specimens of plants, chiefly from the Rocky Mountain region of the United States, which were welcome as supplementing the Museum's too inadequate representation of the Rocky Mountain flora.

From the Royal Botanic Gardens, Kew, England, was received a generous contribution of 676 specimens. Part of these was collected in western Mexico, and there was included also an important fascicle of the Lehmann Colombian collections, which have proved so rich in new species. The Royal Botanic Gardens of Edinburgh, Scotland, contributed 401 specimens of plants from Paraguay, a country with but slight representation in American herbaria. This material is, therefore, most welcome.

The United States National Museum, Washington, D.C., through Dr. William R. Maxon, continued to send exchange material, and this year forwarded to Field Museum 1,001 specimens, principally from Mexico and Panama and other parts of tropical America. From the Office of Systematic Agrostology of the United States Department of Agriculture, through the interest of Professor A. S. Hitchcock and Mrs. Agnes Chase, there were received 312 specimens of grasses, chiefly from tropical American countries.

The Museum has continued its policy of confining purchases of herbarium material chiefly to collections from tropical America, and almost all the 4,710 specimens so acquired during the year are from Central and South America.

The purchases include 300 specimens from Trinidad, a continuation of the series of former years obtained from Mr. W. E. Broadway of Port-of-Spain. There were obtained by purchase, also, 100 specimens of cryptogamic plants collected in Europe, and fifty-three photographs of Mexican plants procured by Mrs. Ynes Mexia, San Francisco, California.

From Mr. Marcus E. Jones of Claremont, California, there were purchased 623 specimens which he had gathered in Lower California. The collection contained many duplicate types of species described by the collector in his publication, *Contributions to Western Botany*.

Mr. C. L. Lundell of New York, in the course of his studies of rubber- and chicle-yielding plants of British Honduras, collected for Field Museum an excellent series of 962 specimens, illustrating the flora of the northern part of the colony. The material contains many unusual and some new species, and the numerous duplicates will be available later for exchange purposes.

Most of the material acquired by purchase came from South America. The largest collection consisted of 1,079 specimens obtained in Bolivia by Mr. José Steinbach of La Paz. Study of certain groups of his collections indicates that the flora of this country is far from exhausted, as some botanists had erroneously supposed, for his series contains a large proportion of plants which seem altogether to have escaped the attention of earlier and presumably competent collectors in the region.

From Mr. Henry Pittier, of Caracas, Venezuela, whose collections have contributed so greatly to the present knowledge of Central and South American floras, there were purchased 320 specimens of Venezuelan plants. From Ecuador were received 342 specimens brought together from the high mountains by Brother Gemel-Firmín of Quito.

Of Argentine plants there were purchased 500 specimens, mostly of woody species, gathered by Professor S. Venturi of the Museo de la Universidad de Tucumán, Argentina. Another collection acquired consisted of 331 specimens procured by Mr. W. Lossen. One hundred specimens of Chilean plants collected by Professor Montero also were obtained by purchase.

More than one-third of the herbarium material received during the year was the result of the work of Museum expeditions.

Great success attended the efforts of the Marshall Field Botanical Expedition to the Amazon in securing herbarium material and wood specimens. Acting Curator Dahlgren and Mr. Emil Sella of this expedition obtained in the vicinity of Belem, state of Pará, Brazil, and upon the Tapajoz River, 2,500 herbarium specimens of plants. Only a small portion of their collections has been named up to the present time, but it is expected that the determination will be completed in the near future. The material, when fully identified, will give the Herbarium a valuable representation of the flora of the Amazon Valley.

The varied economic and other collections made in Pará on the lower Amazon, and in other localities in Brazil, have at the present writing not been catalogued. They include rubber of various kinds; varieties of cacao in pods and the beans; the principal tobaccos of the state of Pará (Parahyba, Bahia, and Rio Grande do Sul), cigars and cigarettes; oils and fats of vegetable origin and their source material; fibers and products, such as baskets, hats, rope, cassava products, beans, seeds, and woods, the last chiefly for the study collections. In addition these collections contain plant material, both dry and preserved in formalin, for use in the preparation of exhibits for the Hall of Plant Life, together with photographs, molds, and color sketches of the material collected.

Dr. Dahlgren also obtained in the state of Pará a splendid exhibition series of the woods most valued in the local industries of the region, which is noted for its abundance of fine cabinet woods.

Mr. Williams, of the Peruvian division of the Marshall Field Botanical Expedition to the Amazon, has forwarded to the Museum 9,500 herbarium specimens, and 1,088 wood specimens which he assembled in eastern Peru. The wood specimens were all accompanied by herbarium specimens, which will make possible their accurate determination. This collection, when it has been named, will add many species to the Museum's series, and make a noteworthy addition to the present knowledge of the woods of the Amazon Valley. Mr. Williams' operations thus far have been in the general region of Iquitos, at the head of navigation on the Amazon River. The results of his labor bring to North America the first adequate representation of the flora of this area, which is almost unknown botanically except for the historic collections made there

many years ago by Richard Spruce. Mr. Williams' material makes a very notable addition to the Museum's already rich collections of Peruvian plants.

A further addition to the Museum's Peruvian series consisted of 888 specimens obtained in the Department of Cuzco, Peru, by Dr. August Weberbauer (Marshall Field Expedition to Peru, 1929).

Five specimens of economic British Honduras plants were received from Assistant Curator J. Eric Thompson, Department of Anthropology (Second Marshall Field Archaeological Expedition to British Honduras).

From the William V. Kelley-Roosevelts Expedition to Eastern Asia there were received 400 specimens of plants obtained by Mr. F. Kingdon Ward in Burma and Indo-China, and more than 2,400 collected by Mr. Herbert Stevens in the province of Szechwan, China.

As a result of work under the Rockefeller Fund for Photographing Type Specimens, a total of 2,603 negatives has been secured. There had been received at the end of the year 819 negatives of types in the Museu Goeldi of Pará, obtained by Acting Curator Dahlgren, and thirteen photographic prints of type specimens in the Berlin Herbarium, received from Assistant Curator Macbride. A total of 1,784 negatives had been made in Berlin, but these had not been received at the time this Report was prepared.

Among the accessions should be mentioned, also, 5,593 photographic prints prepared in the Division of Photography of Field Museum. These include prints of many type specimens of Brazilian species, and photographs of interesting specimens received by the Department on loan for study purposes. Placed in the Herbarium, they are of the greatest value in the determination of collections received currently for identification, and as a basis for monographic work. Among these prints are many duplicates, especially of Peruvian types, which it is expected will be used to good advantage for exchange purposes.

Through the interest of Professor Record, Associate in Wood Technology, there have been obtained several important gifts of wood specimens for exhibition purposes. Particularly noteworthy are three handsome panels illustrating the best types of Cuban, Mexican, and Peruvian mahoganies, presented by Ichabod T. Williams and Sons of New York. These form an attractive display of the chief types of this most important of all tropical American

woods, which serves as a standard for the comparison and estimation of fine woods generally. At present they are on exhibition in Stanley Field Hall.

The F. B. Williams Cypress Company, Limited, of Patterson, Louisiana, generously sent four boards of normal and pecky cypress lumber, part of which has been placed on exhibition in the new arrangement of the North American Wood Hall. The Pickrel Walnut Company of St. Louis, Missouri, donated three fine walnut boards which have served to complete the reinstallation of the walnut exhibit. The Panhandle Lumber Company of Spirit Lake, Idaho, contributed a large board of western pine which has been placed on exhibition in the same hall. From the American Walnut Manufacturers' Association of Chicago was received a desirable wheel section of black walnut which was needed to present a complete display of this important American wood.

Through the interest of Professor Emanuel Fritz of Berkeley, California, there was secured from the Sugar Pine Producers of California some desirable material for exhibition purposes. It consisted of five well-prepared sugar pine planks, and an extensive collection of the huge cones borne by this California tree.

The School of Forestry of Yale University, New Haven, Connecticut, donated a board of black willow which permitted the proper installation of a complete exhibit of the wood of this widely distributed tree. There was received directly from Professor Record a most unusual abnormal growth from a flowering dogwood tree, simulating in uncanny fashion the head of a chimpanzee.

The All-American Mohawk Radio Corporation of Chicago presented the Museum with three wood specimens, one of which was a handsome sheet of veneer of Australian silk-oak, such as is used for the finishing of radio cabinets. The firm of Bauer and Black of Chicago donated for use of the Marshall Field Botanical Expedition to the Amazon one of their airplane first aid kits.

Useful material for the completion of certain wood exhibits was supplied by T. W. Minton and Company, Barboursville, Kentucky, in the form of two samples of hickory wheel spokes. The Turner, Day and Woolworth Company of Louisville, Kentucky, contributed four examples of hickory ax and hammer handles and samples of hickory nuts.

The United Fruit Company, at the suggestion of Professor Record, sent to the Museum an eight-foot section of a trunk of the

Guatemalan cow-tree (*Couma guatemalensis* Standley), which was placed on exhibition in Hall 27, where it has attracted a great deal of attention.

Mr. Charles Westcott of River Forest, Illinois, presented a specimen of the wood of the beefwood tree (*Casuarina*), from Florida, accompanied by herbarium material of the tree from which the wood was taken.

Mr. John A. Manley of New Brunswick, New Jersey, donated an unusual sample of apple wood, in which, through long years of growth of the surrounding woody tissue, there had become completely imbedded a horseshoe.

Captain Arthur Pay of Paramaribo, Surinam, presented the Museum with five samples of *Sickingia* wood from that colony. This wood is remarkable for its fine and compact grain and especially for its beautiful pink color.

Mr. H. C. Benke of Chicago, during a botanical collecting trip to Texas and New Mexico, obtained for the Museum thirty-eight specimens of wood of plants characteristic of that semi-desert region.

By exchange there were received from the United States National Museum, Washington, D.C., 144 hand samples of woods. These represent chiefly tropical American trees, and form a desirable addition to the Museum's rapidly growing study series of wood specimens.

Two years ago the economic collections of the Department of Botany received a unique and valuable addition through the finding of Babylonian wheat by the Field Museum-Oxford University Joint Expedition to Mesopotamia. This year there were received from the expedition four more samples of ancient grain (Plate VI) unearthed in January, 1928. Three of these were found in three separate jars in the ruins of the buried city of Kish, "the first city founded after the flood." The discovery was made by Mr. Henry Field, Assistant Curator of Physical Anthropology, who at that time was a member of the expedition. The jars containing the grain were found in rooms of two ancient buildings buried for thousands of years thirty-two and forty feet respectively below the original surface of the mounds covering eastern Kish. The lower building was in a stratum just above the level where traces of a flood were discovered which, according to the archaeological evidence obtained, occurred about 3200 B.C.



AMERICAN KING SNAKES

Section from Systematic Exhibit of Reptiles

Reproductions in cellulose-acetate by Leon L. Walters

About one-tenth natural size

The grain in its present condition is practically pure charcoal and it is, perhaps, owing to this fact that it was not destroyed long ago by fungi, insects, or moisture. The grain has been examined by five experts of the United States Department of Agriculture, all of whom pronounced it to be barley. Mr. C. E. Leighty, one of the experts, reports that the samples are composed entirely of barley and that examination reveals no other cereal grain. Messrs. O. F. Phillips, Hazen P. English and Albert F. Nelson, three others of the experts, report jointly: "While time and the elements have charred and blackened the kernels to the extent that positive identification is rather difficult, we are of the opinion that each of the samples is of some form or type of barley. We are influenced in arriving at this conclusion by the appearance and shape of the crease (slightly twisted in some kinds), flattened backs, boat shape of kernels, and germ shape, all of which are more or less common to our modern barleys.

"Time, abrasion, and possibly method of threshing, all have had a part in accounting for the apparent absence of the outer husk or hull of the kernels.

"The grain from the upper levels is apparently a different type than that in the other two containers, as the kernels as a whole are much smaller. The barley characteristics are much more pronounced in the sample from the lower level, which has been dated at about 3500 B.C.

"There can be but little doubt, however, that each of the samples is of some species of barley."

Mr. H. V. Harlan, the fifth expert, states: "I am able to make only a partial determination of the barley in the samples which you recently forwarded. All three samples contained seeds of six-rowed hulled barleys. This does not preclude the possibility of there being hull-less or two-rowed sorts present. I could, however, find no kernels which could be identified as either. The grain seems to be slightly smaller than that coming from Egyptian excavations, and I think it is safe to say that it represents different varieties."

Modern grain is represented in the accessions of the year by four samples of prize wheat from Australia, grown in New South Wales, of the varieties *Cedar*, *Perfection*, *Comeback*, and *Cedrick*. These were obtained by the courtesy of the Chicago International Live Stock Exposition.

Some canna roots were obtained by purchase for the exhibit of starchy tubers, and several specimens of coontie, a starch-bearing

cycad native to southern Florida, were received from Professor A. H. Gilbert of the Department of Botany of the University of Miami at also Coral Gables, Florida.

A sample of Mexican crude guayule rubber, collected in Chihuahua, Mexico, by Mr. George Ewald of Chicago, was donated by him. This is the only authentic specimen of guayule rubber in the Museum's collection and is of interest as a sample of rubber which is also produced in the United States.

Four specimens of "rainbow" corn were donated by William Thuring of Chicago. These represent results of interbreeding Indian corn of various colors.

GEOLOGY.—The Department of Geology received during the year accessions from seventy individuals and institutions. Of these fifty were by gift, three by exchange, seventeen by purchase, and five from Museum expeditions. The total number of specimens thus received and catalogued is 1,480.

The large number of gifts shows that continued interest is being taken in the progress of the Museum by many donors. Mr. Richard T. Crane, Jr., presented three valuable specimens of cut gems. The most important of these was a large aquamarine from Brazil weighing $341\frac{1}{2}$ carats. This is one of the largest aquamarines ever cut, and exceeds in size any previously in the Museum collection, although the series of these stones in the collection was already remarkable for the size and quality of each specimen. The Crane aquamarine is flawless and of a rich blue color. It is cut as an oval brilliant, and is two inches long, one inch wide, and one inch thick. The other two cut gems presented by Mr. Crane were a cabochon ruby weighing eight carats, and a chrysoberyl cat's-eye weighing six and one-tenth carats, both from the gem mines of Ceylon. As neither of these gem varieties had been well represented previously in the collection the addition of these is gratifying.

To Mr. William J. Chalmers of Chicago the Museum is indebted for continued additions to the collection of crystallized minerals. Thirty-four specimens of these were received during the year from Mr. Chalmers. One group consisted of minerals from Madagascar. These are all large specimens, and include a complete hexagonal prism of blue beryl with some gemmy spots, the crystal being seven inches in diameter and of equal length; a doubly terminated crystal of corundum, ten inches in length; a mass of rose quartz of fine color and transparency; and a semi-transparent, terminated crystal of

rubellite. Another group includes twenty-seven specimens of new and choice examples of species from localities not hitherto represented. Among these a beautifully terminated and transparent crystal of golden beryl from Serro in Brazil is especially important. A number of minerals from new localities in Africa in the same accession included fine groups of azurite and cerussite from Tsumeb, a series of corundums from the Transvaal, and vanadinite from the Abenab mine. The crystals of vanadinite are remarkable for their size, some being two inches in length. There was also included a prismatic crystal, two inches in length, of malachite after azurite. A large specimen of the recently discovered collinsite and quercyite from British Columbia was another valuable accession received from Mr. Chalmers.

A notable addition to the exhibit of gems was also received through the gift of forty-nine specimens from Mrs. Joseph W. Work of Evanston, Illinois. Of these, the series of opals received was especially large and valuable. These numbered twenty-nine stones, of which twenty were from Australia, seven from Mexico and two from Honduras. Of the Australian opals, fifteen were of the white variety, three blue-black, and two green. The gift also included seven star sapphires, two rhodolites, one kunzite, two mounted pieces of jade and a mounted blue pearl. These specimens were acquired during years of travel and collecting by Mrs. Work and her husband, the late Joseph W. Work. Mrs. Work's desire to have them placed where they would be visible to the public led her to present them to the Museum. In order that her gift might not include gems already well represented in the Museum, Mrs. Work very kindly allowed selections to be made from her entire collection.

A specimen of the newly described mineral collinsite from British Columbia was an appreciated addition presented by Mr. W. D. Lukens, a resident at the locality where it is found.

Orthoclase crystals from a new locality in Colorado were presented by Mr. W. F. Planer of Hammond, Indiana.

Mr. and Mrs. William and Toodie Bower and Mr. Franklin Bower generously presented a partial skeleton of a mastodon which was excavated on land owned by them at Argos, Indiana. The parts received include a nearly complete skull and lower jaws, twenty-two vertebrae, ten entire ribs with parts of others, about sixty foot bones, and several miscellaneous limb bones.

To Former Judge George Bedford of Morris, Illinois, the Museum is indebted for a number of remains of mammoth, mastodon, and moose of an extinct species, which represents practically the entire results of his recent exploration of a large deposit at Minooka, Illinois. Some specimens were obtained from this deposit a number of years ago, but excavation there was after a time suspended at the request of the landowner. During the year 1929, however, permission was given to Former Judge Bedford to continue excavation, and with great generosity he presented practically the entire results of his work to the Museum. A fine tusk and lower jaws of mammoth were important specimens found and received, also parts of skeletons of two individuals of mastodon, a skull and antlers of *Cervalces* and miscellaneous bones of bison.

A collection consisting chiefly of fossil invertebrates and plants, numbering altogether 393 specimens, was presented by Mr. Henry Gebauer of Chicago. Among the fossil plants were a number of fine specimens, especially a large one of Neuropteris. There were 380 specimens of invertebrate fossils and plants included, and most of these had been carefully identified and labeled. This collection also included seven specimens of minerals and one fossil fish from Syria.

Ritchie Brothers of Saratoga Springs, New York, gave five specimens of fossil algae from this well-known locality. These specimens of this early form of plant life are large and well-preserved. One of the group has a diameter of about two feet.

Two beautifully preserved fossil ammonites from County Antrim, Ireland, were presented by Mr. Bryan Patterson of the Department of Geology. The specimens were collected by his grandfather, the late William Gray, a British paleontologist. Mr. Patterson, together with Messrs. Paul Nieh of Chicago, F. H. Letl of the Department of Zoology, and Leroy Kranz and Clarence Lahde of Harvey, Illinois, also presented a number of fossil plants from Mazon Creek, Illinois. In Mr. Letl's donation were also included thirty-two specimens of invertebrate fossils from Amboy, Illinois.

A complete section, with crust, of the Lafayette stone meteorite was presented by Purdue University through the kindness of Professor H. E. Enders. This section, weighing 123 grams, represents about one-third of the entire specimen. It furnished sufficient material for analysis and a piece of good size for exhibition. Thus far it is the only portion of this meteorite that has been removed from the original.



BRANCH OF HONDURAS MAHOGANY

Stanley Field Hall, Case 21

A branch of the mahogany of the east coast of Mexico and Central America

Reproduced in Stanley Field Plant Reproduction Laboratories

One-tenth natural size

In addition to the cast and specimen of the Tilden meteorite presented last year by the Illinois State Museum, a cast of the nine-pound meteorite from the same fall was given during the year by the same institution through Dr. A. R. Crook, Curator.

Sixty-four specimens of quartz crystals from a new locality in McCurtain County, Oklahoma, were presented by Mr. J. H. Keester, of Cicero, Illinois.

An interesting series of thirty-five geodes, showing various stages of transition of fossil crinoids into quartz geodes was presented by Mr. J. G. Prasuhn of the Department of Anthropology. These specimens were collected by him in Morgan County, Indiana. They show beyond question that the somewhat disputed view that geodes may be formed from fossil crinoids is, in one locality at least, correct.

From the Chicago, Milwaukee, St. Paul and Pacific Railroad a large sand-lime concretion, thirty inches in diameter and weighing 1,150 pounds, was received by gift. This concretion has an almost spherical form and affords a valuable exhibit to illustrate the size and shape in which such concretions may occur. This specimen was obtained from Mobridge, South Dakota.

Two sand-lime concretions from the Salton Sea, California, one of which is unusual in size, were an appreciated gift from Mrs. S. A. Williams of Chicago. Concretions from this locality are remarkable for their peculiar forms, and one of those presented by Mrs. Williams was much larger than any previously possessed by the Museum.

The Standard Oil Company (Indiana) gave 105 varieties of petroleum products which will enable a thorough revision to be made of the exhibit of petroleum products which this company previously provided. The specimens received in this gift were either entirely new to the collection, or replaced previous specimens that had deteriorated.

Another interesting contribution to the petroleum series was a specimen of crude petroleum from the world's deepest producing oil well. This was presented by Mrs. H. C. Morris, of Chicago. It was obtained from a depth of 8,523 feet in Reagan County, Texas. Besides the great depth of the well, it is interesting to note that the specimen is composed of 70.6 per cent gasoline.

By exchange with the University of Chicago, articulated skeletons of the fossil so-called "ruminating hogs," *Oreodon* and *Merychyus*, from Sioux County, Nebraska, were received. While single

bones of these animals are relatively common in some localities, complete skeletons are rare, so that these make an acquisition of much value.

From the Colorado Museum of Natural History, Denver, there was received, also by exchange, a completely prepared skeleton of *Trigonias*, the most ancient and primitive representative of the true rhinoceroses. This interesting form, characterized by having four toes on the front foot instead of three as in modern rhinoceroses, and by other peculiarities, will afford a valuable addition to the series illustrating the development of the rhinoceros in North America.

By exchange with Mr. Arthur Blocher of Amboy, Illinois, eighty-seven specimens were added to the collection of fossil invertebrates. These were chiefly from Illinois.

Some valuable additions were made to the gem collection by purchase. One of these was a cut black opal of unusual brilliance, weighing fourteen carats, from Australia. As this is a stone for which frequent inquiries are made, it is gratifying to have this fine specimen. Other cut stones added by purchase were one of the new and interesting gem "starlite," or blue zircon, weighing three and four-tenths carats, and a green garnet from South Africa weighing seven carats.

Since synthetic gems have become so widely known and used, it was deemed desirable to add a series of them to the gem collection for comparison with the natural stones. Accordingly, a series of thirty-five specimens of these was purchased. This series shows a boule and a cut stone of each variety. It contains synthetic sapphires of thirteen and rubies of three different colors. A synthetic blue spinel is also included.

To the meteorite collection several additions were made by purchase. One of these was an etched section of the Weekeroo, Australia, iron meteorite, weighing 6,465 grams. It represents a new type of meteorite, since it is intermediate between the iron-stones and the irons.

A portion of the stone meteorite from Troup, Texas, was also purchased, a full-sized section of forty-three and two-tenths grams being obtained. Specimens from this meteorite are extremely rare.

Another addition to the meteorite collection by purchase was an interesting series of fourteen specimens of the Brenham, Kansas, fall. These were individuals which had been found during 1929,

while the original fall had occurred previous to the year 1882. The long exposure to ground waters which the later-discovered individuals had undergone, produced peculiar alterations, a careful study of which, it is hoped, will make it possible to determine the nature of other similar objects of suspected meteoric origin.

A beautiful series, numbering eight specimens, of echinoids from Florida, was obtained by purchase. These echinoids are unusual because of their shape and complete preservation. Two specimens of fossil crinoids purchased are also notable for their perfection of form and preservation. Those obtained are from a locality in Bundenbach, Germany.

A valuable addition to the series of vertebrate fossils obtained by purchase was one of partial skeletons of several species of early Tertiary mammals from Utah. These included a skull and jaws, limb and foot bones of the primitive cursorial rhinoceros *Hyrachyus*, a similar series of remains of *Protoreodon*, the ancestor of *Oreodon*, and a partial skeleton of the so-called "short-faced pig," *Achaenodon*.

A beautifully executed model, six feet square, of Glacier Park, Montana, was added by purchase to the series of relief maps. This model has a horizontal scale of one inch to the mile and a vertical scale of one inch to a half-mile. Roads, trails, and various features of scenic interest in the area are fully and accurately represented on the model.

The most important accession from expeditions was that of 173 specimens of volcanic products collected by the Marshall Field Expedition to the Mount Taylor, New Mexico, region. Of these specimens about one hundred represent different forms of lavas. Two large masses, the surface of one of which covers about four square feet, represent in a striking way the stages of flow of viscid lava. Other forms include lava stalactites, volcanic bombs, scoria, lapilli, cellular basalts, and others. A series of thirty specimens shows interesting stages in the alteration of volcanic ash to bentonite. From the Cornelius Crane Pacific Expedition of the Department of Zoology there were received three specimens of volcanic rocks from the Fiji Islands, and from the Marshall Field North Arabian Expedition eleven specimens of desert sands and one specimen of loess.

ZOOLOGY.—Accessions of zoological specimens for the year reach the large and unprecedented total of 23,754, of which 14,468 are vertebrates. Moreover, this does not include some 12,000 fishes

received from the Cornelius Crane Pacific Expedition, which are temporarily in the custody of Stanford University. After being studied, at least half of these will be permanently accessioned. The large additions to the collections are due mainly to the success of various expeditions.

The accessions are distributed as follows: mammals, 2,662; birds, 7,055; reptiles and amphibians, 3,140; fishes, 1,611; insects, 9,286. The number obtained by Museum expeditions is 22,347; by gift, 1,024; by purchase, 271; and by exchange, 112.

Gifts of mammals were unusually few, altogether amounting to only fifteen specimens, including several local mammals obtained by members of the Staff. Lord Astor, of London, presented a British stoat and a wildcat, both welcome additions to the collections. A sea-elephant, received in the flesh from Hagenbeck Brothers, of Stellingen, Germany, yielded a skeleton of this animal, but the skin was not recoverable.

Among the mammals received from major expeditions were many rare and little-known species as well as a number which careful study will doubtless prove to be new to science. From the William V. Kelley-Roosevelts Expedition to Eastern Asia, the peculiar carnivore known as the giant panda is of first importance. The few specimens of this rare animal which have previously reached museums have been from native sources and are more or less incomplete. The specimen obtained by Messrs. Theodore and Kermit Roosevelt is perfectly prepared, accurately measured, and accompanied by a skull and a complete skeleton, the first ever to be preserved. The exact relationships of this animal are of much interest to technical zoologists, and the opportunity presented for study of an entire skeleton is indeed welcome. The acquisition of the giant panda, therefore, not only provides a rare and interesting specimen for public exhibition, but also furnishes material of high importance for scientific study.

As mentioned elsewhere, the Kelley-Roosevelts Expedition obtained an extensive and varied collection of mammals from southwestern China and northern Indo-China, altogether forming the largest and most important accession of Asiatic mammals ever received by the Museum. Among the small and medium-sized mammals are some of great rarity and a number not heretofore represented in any American institution. Of especial interest is a carnivore of the civet family which is the third known specimen of a genus (*Chrotogale*) only recently discovered. Another medium-

sized mammal obtained by the expedition is the rare and beautiful monkey known as the golden monkey (*Rhinopithecus*) or snub-nosed monkey. The larger mammals from this expedition are thirty to forty in number and fulfill, to a large extent, the remaining needs for the habitat groups of large Asiatic mammals which it is proposed to prepare for installation in William V. Kelley Hall. Most important are the Indian bison, the seladang or gaur ox, the banting, and the Indian water buffalo.

Mammals received from the Crane Pacific Expedition are mainly small and medium-sized, but are of great interest, representing many genera and species not heretofore possessed by the Museum. An especially fine series of bats was obtained, embracing two sub-orders, sixteen genera, and thirty-two species. A great many of these are large fruit-bats or "flying foxes," which are difficult to procure except by a privately organized expedition of this kind. A new species of rodent was discovered in the Galapagos Islands by the expedition, and has been described in the Museum's publications under the name *Nesoryzomys darwini* in honor of Charles Darwin who first discovered rodents in these islands. During the final work of the expedition in Borneo, an important collection of the mammals of that island was made, including five well-preserved orang-utans.

Accessions of mammals from the Harold White-John Coats Abyssinian Expedition of Field Museum are featured by material for two important habitat groups. One of these is a lion group for which five choice specimens were obtained, and the other is a very large water hole group, specimens for which include five reticulated giraffes, several Grevy's zebras, elands, gazelles, and a black rhinoceros. This expedition also collected certain other mammals, among them three aard-varks, the first well-prepared examples of this interesting animal ever received by the Museum.

Seven fine Pacific walrus and five Alaskan caribou were received from the Thorne-Graves Arctic Expedition of Field Museum. These were especially prepared for use in habitat groups, and reached the Museum in excellent condition. They form a notable part of the year's accessions of mammals.

Colonel J. C. Faunthorpe continued a limited amount of work in British India. Specimens of mammals received from him include a sloth bear, a spotted hyena, and a very fine adult male Indian lion, this last being a very scarce and desirable acquisition.

From the Third Asiatic Expedition of the American Museum of Natural History, in which Field Museum cooperated, 197 specimens of Asiatic rodents were received during the year.

Accessions of birds were very large, those entered on the records numbering 5,809, to which should be added 1,157 received too late for entry, making a total of 7,055. Most of these were obtained by expeditions, 5,194 being from the Kelley-Roosevelts Asiatic Expedition alone. Much time and study will be required to evaluate this superb collection, but preliminary examination indicates that it contains a considerable number of new and undescribed species, various little-known and rare species not heretofore brought to America, and a large, comprehensive representation of the avifauna of southeastern Asia, nearly all new to Field Museum.

Birds received from the Crane Pacific Expedition number 1,228 specimens, covering a wide variety of localities and including a very high percentage of unusual and desirable types to be seen only in a few of the largest museums in the world. Of especial interest are the flightless cormorant of the Galapagos Islands, the rare land birds of Cocos Island, certain petrels and other birds of the open sea, and various birds of exceptionally beautiful plumage—parrots, lorries, and pigeons from the South Sea Islands and hornbills, cockatoos, and birds of paradise from Borneo and New Guinea.

Birds were not an especial object of the Harold White-John Coats Abyssinian Expedition, and only a few specimens were taken, but among them was a very distinct new species of francolin, a pheasant-like game bird. A good series of the scarce Abyssinian blue goose was also secured by this expedition.

An important accession of birds was obtained in Arizona by Taxidermist Ashley Hine. This consisted of 323 specimens especially selected and prepared for mounting to fulfill needs in the Museum's systematic exhibit of North American birds.

By exchange and purchase a few scarce birds have been added to the collections, mainly from Neotropical America. Among them may be mentioned *Cossyphopsis reevei* from Ecuador, *Pyrrhura viridicata* from Colombia, and *Sapayoa aenigma*, *Manacus cirritus*, and *Tangara palmeri* from Panama.

A valuable gift was that of two paintings of American birds by the late Louis Agassiz Fuertes, presented by Colonel Albert A. Sprague. These are of large size (18" x 30") and are among the finest existing examples of Fuertes' work. The subjects are the American horned owl and the American goshawk.

The most important accessions of reptiles are those obtained by the Crane Pacific Expedition, numbering 2,006 specimens. Notable are well-preserved shells of the extinct tortoise of Charles Island, Galapagos; series of the reptile fauna of the Fiji Islands, Solomon Islands, and New Hebrides; an excellent series of the two species of crocodiles from New Guinea, including the recently discovered *Crocodylus novae-guineae*; and a representation of the faunas of New Guinea, Celebes, Borneo, and the Philippines, hitherto entirely wanting in the Museum's collections. Reptiles from the Kelley-Roosevelts Expedition consist of 228 specimens, mainly snakes, from northern Indo-China, and 300 specimens, including various amphibians, from western China in the provinces of Yunnan and Szechwan.

Two specimens of an extraordinary lizard (*Palmatogecko*) of the gecko group from the Kalahari Desert in southwestern Africa were received as a gift from Dr. W. J. Cameron of Chicago. This lizard is very pale, practically colorless, and has developed unusual, webbed feet such as might be expected in a swimming animal but which, in this case, appear to be adaptations for progression over loose sand. Ten snakes and frogs from British Guiana were presented by Dr. A. E. Emerson of the University of Chicago, and 295 specimens from Wisconsin by Mr. F. J. W. Schmidt of Stanley, Wisconsin.

The most important fish collection of the year is that made by the Crane Pacific Expedition. This will not be accessioned until it has been studied at Stanford University, but ultimately it will add some 6,000 specimens to the Museum. Preliminary examination by Dr. A. W. Herre of Stanford University, who made the collection, indicates that it contains twenty to thirty unknown species, the majority from New Guinea. Sixty-four plaster molds of fishes with detailed color notes for exhibition purposes accompany this collection.

Fresh-water fishes from western China were collected by Mr. Herbert Stevens of the Kelley-Roosevelts Expedition to the total of 438, a number which appears small but which really represents one of the largest collections of the kind ever made in this part of the world.

Six accessions of fishes were received as gifts during the year. Mr. Frederick H. Rawson of Chicago presented a mounted trunk-fish; Mr. Fred N. Peet of Chicago sent three Canadian brook trout; and Mr. E. L. Vacin of Chicago gave a very fine specimen of the northern muskallonge. The General Biological Supply House of

Chicago presented six specimens, including a very rare eel, of which only four or five had been seen previously by scientists. Dr. W. C. Kendall of Freeport, Maine, gave nineteen specimens of the eastern tomcod, a species not previously well represented in the Museum. Mr. Donald Bennorth of Elgin, Illinois, presented five interesting lampreys, a small trout, and a darter, all from Illinois.

The number of insects and their allies accessioned is 9,286, consisting of 520 donations and 8,766 specimens collected by Museum expeditions. Mr. E. B. Williamson of Bluffton, Indiana, showed his continued interest in the insect collection by presenting 106 named dragon flies from the Americas. Dr. A. E. Emerson, of the University of Chicago, presented 369 named termites representing fifty-one species and including sixteen paratypes of these interesting social insects. From the Crane Pacific Expedition were received 928 insects, scorpions, centipedes, millipedes, and spiders. A large collection of insects came from the Kelley-Roosevelts Expedition, reaching a total of 7,853 specimens, about two-thirds of which are butterflies and moths from western China. This collection, at present only roughly classified, forms a notable addition to the Museum's series of Asiatic insects and will doubtless serve to contribute many interesting additions to knowledge.

DEPARTMENTAL CATALOGUING, INVENTORYING AND LABELING

ANTHROPOLOGY.—Twenty-four of the fifty-four accessions in the Department of Anthropology during the year have been entered. Fourteen accessions from previous years were also entered.

The work of cataloguing has been continued as usual during the current year, the number of catalogue cards prepared totaling 10,742. The total number of catalogue cards entered since the opening of the first volume is 188,622. The 10,742 cards written during 1929 for accessions received during the year or in previous years are distributed according to subjects as follows: North American archaeology and ethnology, 2,232; Mexican, Central and South American archaeology and ethnology, 985; archaeology and ethnology of China, Indo-China, and Japan, 136; archaeology and ethnology of India, 16; ethnology of Persia, 2; ethnology of Polynesia, 16; ethnology of Melanesia, 18; ethnology of Malaysia, 1,565; archaeology and ethnology of Africa, 587; archaeology of Egypt, 101; archaeology of Mesopotamia, 7; prehistoric archaeology of Europe,



TYPE OF CASE LOANED TO THE SCHOOLS OF CHICAGO BY THE N. W. HARRIS PUBLIC SCHOOL
EXTENSION OF FIELD MUSEUM OF NATURAL HISTORY

One-sixth actual size

5,077. Of these cards 7,463 have been entered in the inventory books, which now number fifty-three volumes.

About 3,000 labels were prepared by the Staff during the year, and 7,604 copies of them were supplied by the Division of Printing for use in exhibition cases. These labels are distributed according to subjects as follows: archaeology of Egypt, 1,226; archaeology of Hopewell Mounds, 543; ethnology of Plains Indians, 2,304; ethnology of California, 1,426; ethnology and archaeology of Mexico, 961; ethnology of South America, 399; archaeology of China, 99; ethnology of Japan, 216; ethnology of Malaysia, 354; ethnology of India, 26; archaeology of Kish, 45; Roman archaeology, 5. Sixty maps, 6,745 catalogue cards, and five miscellaneous impressions were also supplied by the Division of Printing.

The total number of photographs placed in the albums amounts to 3,501. Nine new albums were opened.

BOTANY.—Descriptive labels were written by Assistant Curator McNair during the year for additions to the exhibits of nuts, tubers, and starches in Hall 25. As mentioned elsewhere in this Report, he also prepared card catalogues of plants that contain large quantities of starch, sugar, gums, tannins, resins, drying oils, semi-drying oils, non-drying oils, fats, and waxes. These cards are of value in obtaining and arranging material for exhibits of varnish resins, edible oils, and paint oils. They have also been of use in writing scientific papers on the differential analysis of starches and the relation of various oils to specificity, environment, and origin of plants.

The additions to the records of the Herbarium during 1929 amounted to 19,979, the total of mounted specimens now being 600,336.

Labels were written for many thousands of herbarium specimens received during the year, particularly for the collections made in Brazil by Acting Curator Dahlgren and for those obtained in Peru by Mr. Williams. Several thousand labels were prepared, also, for the duplicate specimens distributed. Descriptive labels were written for several cases of the N. W. Harris Public School Extension of Field Museum.

About 1,900 index cards were received this year from the Institut Colonial de Marseille. They deal with the literature pertaining to tropical agriculture and give title of article, author's name, full

bibliographic reference, and classification. There are fifty-seven different subjects, such as cereals, edible legumes, and plants used for textiles, oils, perfumery, spices and condiments, gums and resins, medicine, and other purposes.

GEOLOGY.—The number of specimens catalogued during the year was 1,480, making the total number of catalogue entries 185,952. Of those entered during the year, the largest number in any single group was that of the Gebauer collection of fossil invertebrates and plants which totaled 393 specimens. Other large groups were 173 specimens of volcanic products, 105 specimens of petroleum products, and 73 additional specimens of invertebrate fossils. Altogether, 697 specimens of invertebrate fossils were catalogued, 259 of minerals, 250 of specimens illustrating physical geology, and 164 of economic specimens.

For greater convenience of reference, the records of the several collections of fossil vertebrates were copied from the older books and combined in a loose-leaf cover. To the card catalogue of vertebrate fossils fifty-seven cards were added. These cards give full descriptions of each specimen, including field number, name of collector, date of collection, locality, horizon, and reference to description of type specimen.

A total of 6,822 labels was received from the Division of Printing during the year, of which 3,659 related to paleontological exhibits and the remainder chiefly to the systematic mineralogical exhibit. Of these labels, 5,807 were installed in the cases. Illuminated labels were prepared for the Neanderthal Man exhibit in Ernest R. Graham Hall.

Copy for 4,388 labels was prepared and delivered to the Division of Printing. These included labels for the larger part of the meteorite collection and for the remainder of the systematic collection of minerals. Typewritten labels, 273 in number, were prepared and installed for temporary use with various exhibits, chiefly those of the silicas, petroleums, and gems.

Photographic prints, 369 in number, were mounted in the Department albums during the year. In addition, the series of 550 field negatives made by the Second Marshall Field Paleontological Expedition to Argentina and Bolivia was catalogued and labeled. The total number of prints now in the albums is 6,362.

ZOOLOGY.—Entries in the zoological catalogues were made for a total of 5,324 specimens. These were distributed, by divisions, as follows: mammals, 2,449; birds, 924; reptiles and amphibians, 1,951; skeletons, 10.

All specimens of mammals were numbered as catalogued, and new Museum labels were provided for 272 specimens. In addition, 950 labels for skins of large mammals were written and attached. About 250 skull bottles were labeled. Guide labels were typed and affixed to all the drawers of the new storage cases for mammals. An alphabetical index and guide to the mammal collection was prepared and bound in book form. Exhibition labels for all mammals in George M. Pullman Hall were prepared and printed and are awaiting installation. Transparent labels were prepared for five large habitat groups of mammals. All labels for the African groups in Carl E. Akeley Memorial Hall were revised, reprinted, and reinstalled. Distribution maps were prepared to accompany each of these labels.

In the reference collection of birds, rearrangement of a large amount of material in new steel cases necessitated labeling 842 separate trays and sixty cases and cans. The new exhibits of cranes, rails, and shore birds on two screens were supplied with seventy-four individual labels. In addition, eight wall labels were installed adjacent to cases of the systematic exhibit of North American birds. About 700 labels for the exhibit of foreign birds have been prepared and printed, and are to be installed when label-holders are available. These labels are printed in black on buff cards to replace the silver on black formerly used, and have been revised to bring all names down to date.

Cataloguing of reptiles and amphibians was kept abreast of accessions, and at the close of the year there was no uncatalogued material on hand. Thirty-seven labels were prepared and installed for exhibits of reptiles and amphibians.

In the Department photograph albums 555 prints were mounted and, so far as practicable, each was labeled as to subject.

The state of the catalogues at the end of the year is as follows:

	Number of record books	Total of entries to Dec. 31, 1929	Entries during 1929	Total of cards written
Department of Anthropology	53	188,622	7,463	193,175
Department of Botany	63	600,436	18,299	15,813
Department of Geology	26	185,952	1,480	6,930
Department of Zoology	41	145,919	5,324	40,821
Library	16	186,309	8,137	386,624

INSTALLATIONS AND REARRANGEMENTS

ANTHROPOLOGY.—The principal efforts during the current year were concentrated on installing Egyptian material in a new type of illuminated case, and on installing the new buff-colored screens and labels in Hall 5.

A total of sixty-nine exhibition cases, including one life-size group, were installed during the year, located as follows:

Egypt (Hall J)	29
Frank W. Gunsaulus Hall (Hall C)	2
Arthur B. Jones Collection (Hall G)	1
Stanley Field Hall	4
Plains Indians (Hall 5)	28
North American Archaeology (Hall 4)	2
California Indians (Hall 6)	2
China (Hall 24)	1
Total	69

For the hall devoted to the archaeology of Egypt thirty-seven floor cases in walnut finish, seven feet high, were especially built. There are two types—a narrow case, twenty-one inches wide and five feet, eight and one-half inches long, and a larger one, thirty-two inches wide and seven feet long—both placed against the pilasters. These cases are illuminated by light boxes on top which insure an even diffusion of light over the exhibits. The ceiling lights have been cut off, the underlying principle being that the exhibits, not the hall, should be lighted.

After many experiments and trial installations extending over a period of two months a formula was found by which the greatest possible efficiency in displaying material in these new illuminated cases was achieved. This method of installation has met with universal approval, and has elicited many favorable comments both from experts and the general public. An example is shown in Plate IV. The material thus far installed comprises pottery (six cases), faïence and glass, ushebtis (two cases), alabaster vessels (four cases), canopic jars, stone vases (three cases), stone sculpture (three cases), bronze figures (two cases), mortuary wooden boxes, wooden models, wooden figures, and architectural models. It is hoped that the installation of the Egyptian Hall will be completed in the early part of the coming year. The installation of animal mummies in two cases is at present in actual progress.

The old case sheltering the mortuary boat of King Sesostri III has been renovated with a walnut finish, and by installation of a lighting system in conformity with the other cases in the hall.



IRON METEORITE FROM GLADSTONE, QUEENSLAND, AUSTRALIA
(Hall 34)

Weight 1,240 pounds. About one-fifth actual size

An old-type case containing limestone sarcophagus lids of the Ptolemaic period (fourth to first century B.C.) has been renovated in the same manner.

An illuminated wall case, twenty-six feet long, containing Egyptian papyri, was installed on the southeast wall of the hall, beneath the carved balcony fronts from Cairo. A new continuous built-in case, 108 feet long and two and one-half feet deep, divided into eight sections, has been erected along the central part of the south wall, and will be installed with Coptic garments and fabrics in the near future. Like the other built-in wall cases in the hall it is equipped with an upper compartment, twelve inches deep and thirty-two inches high.

The Japanese collections formerly in the southeast room of the second floor were transferred to Hall C on the ground floor, a portion of the west end of the hall being screened off for this purpose. The name, Frank W. Gunsaulus Hall, used in the old location, is now applied to the new one. The arrangement is practically the same as in the old quarters, save that the model of a pagoda occupies the center of the new room. Two of the six-foot cases were completely reinstalled, one of these, Case 7, with a light-colored screen, upon which has been added material not previously on exhibition. The lacquered saddle presented by Colonel A. A. Sprague was added to Case 4. This case also contains a complete suit of armor made in A.D. 1351 which was presented by Miss Adele Barrett of Chicago in 1924. All labels in this hall, with the exception of the two cases containing sword fittings, were thoroughly revised and reprinted in the newly adopted style, and improvements were made in all cases.

A life-size cast of a Dyak hunter of Borneo (Plate XIII) was added to the Arthur B. Jones Collection in Hall G. In the left hand is a shield used in warding off poison darts or parrying spears or knives. Suspended from the loin cloth is a long fighting knife. In the right hand is a blowgun, the principal weapon both for hunting and fighting. The darts used for the blowgun are carried in a quiver at the hunter's belt. Photographs and data for this figure were obtained by Dr. F. C. Cole in connection with the Arthur B. Jones Expedition to Malaysia in 1922-23. The casting and modeling of the figure was done by Modeler John G. Prasuhn. Six cases in Hall G were provided with labels, which makes the labeling of this hall complete.

In Stanley Field Hall three exhibits were withdrawn and the cases thus vacated were installed with new material. Case 4 now

contains a selection of embroidered articles, chiefly women's dresses, mostly of silk, from western India, presented by Messrs. Cyrus H. McCormick, Martin A. Ryerson, and Homer E. Sargent and collected by Dr. G. A. Dorsey in India in 1915. The exhibit illustrates well the picturesque styles of feminine apparel in vogue in India. A few selected objects from China were temporarily displayed in Case 12. These are a scepter of good luck carved from sandalwood with symbols of longevity in openwork, presented by the firm of Grow and Cuttle of Chicago, and a pair of old cabinet doors of black lacquer painted with scenes in gold lacquer. In the lower compartment of this case is shown a section of a paper roll, twenty-five feet long, painted in ink with a very fine brush. The picture represents one hundred ladies at a garden party, enjoying music, picking flowers, and even playing football. It is a work of the fifteenth century.

Reinstallations were made in Case 7 of Stanley Field Hall in order to make room for the inscribed fossil turtle presented in 1928 by Mrs. Chauncey B. Borland of Chicago (Annual Report for 1928, page 450) and the two polo figures presented by Mr. Earle H. Reynolds this year (see page 97). The old style black labels with aluminum print in this case were replaced by new buff labels with black type.

A temporary exhibition of material from the graves of Kish was placed in Case 11 of Stanley Field Hall in November. These objects belong to the earliest Sumerian period (about 3500 B.C.). The outstanding exhibit is a copper rushlight with a base in the shape of a frog whose eyes are of inlaid limestone. The frog serves as a support for a rod surmounted by five petals which contained the rushes used as a primitive means of illumination. The exhibit includes also fine bowls of alabaster and other stones; copper implements and vessels; shells used as lamps; necklaces of carnelian and quartz, and shell beads. The artistic quality and excellent workmanship of these objects testify to the high degree of cultural achievement attained by the early inhabitants of Kish.

The unique collection of archaeological material from the Hopewell Mounds of Ohio has been reinstalled in two standard cases on buff-colored screens, and is well illustrated by photographs, drawings, and maps. Despite the fact that one of these cases contains 475 and the other 371 objects, the installation is perfectly clear and easily comprehensible, the material being grouped in vertical panels. It conveys a vivid impression of the highly developed culture of the ancient mound-builders and their keen artistic sense, which

reveals itself particularly in their ornaments cut out of sheets of copper and mica, as well as in their admirable sculptures of birds and effigy pipes.

Much work was performed during the year in Hall 5 devoted to the ethnology of the Plains Indians. A total of twenty-eight exhibition cases in this hall have been reinstalled with buff-colored screens and numerous improvements in arrangement (see Plate IX). Labels were carefully revised and re-edited, and then reprinted in the newly adopted style.

Installation progressed in Hall 6, where one case of Californian feather baskets and another of Pomo baskets were placed on exhibition. Old labels were replaced with new ones in eight cases of this hall, and photographs were placed in seven cases. Twenty-five photographs were added to exhibits in five cases of Hall 9, and four cases in Halls 8 and 9 were provided with new labels. Rearrangements were made in three cases of the Gem Room (H. N. Higginbotham Hall).

The ceremonial silk robe presented last year by Messrs. Martin C. Schwab and Henry M. Wolf (Annual Report for 1928, page 451) has been added to the Chinese exhibits at the north end of Hall 24.

For use in the cases of Egyptian archaeology 198 bases and blocks, 337 walnut stands, and forty-six walnut label frames were made.

In the Modeling Section of the Department the life-size figure of a Dyak hunter of Borneo previously mentioned was modeled and cast by Modeler Prasuhn. A visit to the city by a Bushman from South Africa gave Mr. Prasuhn opportunity to make a complete plaster cast of his body, which will be utilized in the future in preparing a life-size Bushman group. The modeler also completed a miniature council house for a village group from Sumatra, and modeled and cast eight human figures for it. He treated 265 Egyptian bronzes by means of the electro-chemical process, retouched eleven casts of Maya monuments in Hall 8, made some repairs on the Maori council house from New Zealand in Hall F, and made a positive from a Chinese coin-mold.

Five hundred and eighty-four objects were treated, repaired or restored. These comprise 152 antiquities from Egypt, 141 from Mesopotamia, 13 from China, 5 from Japan, 15 from North America, 40 from Central and South America, 122 from Europe, 4 ethnological objects, and 92 skulls and bones from Kish.

Identification numbers marked on Museum objects during the year total 15,998.

Material in fifty-three exhibition cases was poisoned during the year. Material stored in the poison room was taken care of in the usual manner and is in good condition.

A new storage room with a floor space of 1,331 square feet has been set aside at the west end of Hall D on the ground floor for American archaeological material. It has been completely equipped with steel shelving. There are 124 bays of eight shelves each, making a total of 992 shelves. Each shelf is three feet long and one and one-half feet deep, making a total of 4,464 square feet of actual shelvage space, which is more than 1,000 square feet in excess of the space in the old storage room.

Dr. Paul S. Martin, who assumed his duties as Assistant Curator of North American Archaeology on October 1, commenced his work by cataloguing two large collections and formulating plans for moving the archaeological material into the new storage room and arranging it in proper order. The new shelvage space has been divided in such a manner that three-fourths of it is devoted to North American archaeology, and the remainder to Central and South American archaeology. About ten thousand objects were moved with the aid of two men in a fortnight. Each object was cleaned and checked with the inventory before its removal into the new quarters. The Hopi pottery was first cared for because it is the largest collection in number from any given area. All uncatalogued material was carefully segregated so that it can be easily located when the time for cataloguing comes.

Twenty-eight cabinets with steel doors, holding 417 wooden trays, were installed in Room 40 for the purpose of storing the material of prehistoric archaeology. The collections obtained by the Marshall Field Archaeological Expeditions to Europe and the Arabian Desert have been unpacked and carefully arranged in the trays in this room. The majority of specimens has been catalogued and numbered.

A new room, designated 36A, was added to the quarters of the Department on the third floor by building a partition wall in the southeast corner and thus screening off a portion of the south corridor. This room will be utilized for the storage of the archaeological material from Kish for which no adequate space was hitherto available. For lack of space a great part of the consignment received

from Kish this year had to be kept in the boxes in which it arrived, but will be unpacked, cleaned, and sorted as soon as racks are built in the new room.

BOTANY.—Owing to the work on material for the Carboniferous forest group for Ernest R. Graham Hall which during the past year occupied most of the time of the Stanley Field Plant Reproduction Laboratories, few new installations were made in the Hall of Plant Life. The many inquiries reaching the Museum about ragweeds, so abundant in this vicinity and important as a source of hay fever infection, led the Director to request that the most common species be represented in the botanical exhibits. Reproductions (see Plate XI), were therefore made of the great ragweed (*Ambrosia trifida*) and the smaller ragweed known as hogweed (*Ambrosia elatior*), which were completed late in the year and installed in Hall 29.

The splendid dried specimen of a sagebrush collected last year in Idaho by Assistant Curator Macbride, and presented by him, was installed in the same hall where it will, for a long time to come, serve as a sample of the most conspicuous element of the vegetation of large stretches of country in the semi-arid regions of the northwest.

Models of poppy and cleome flowers, in storage for some years awaiting related material with which to install them, were remounted and also placed on exhibition in the Hall of Plant Life, as was a model of a large, melonlike pod of an undetermined tropical vine of the milkweed family, the original of which was sent by Professor Record.

The most important recent change in the exhibits of the Department of Botany is the rearrangement of the wood halls which was begun early in the year. The Hall of American Woods has long been in an unsatisfactory condition. Some years ago Professor Record drew up a new plan for the exhibits eliminating a large mass of relatively unimportant material to make room for all of the most important North American timber trees. He also prepared new labels to take the place of the former ones. On the basis of this plan a complete reinstallation is now being effected. The lacking material is being supplied generously by individuals and concerns interested in various phases of the American lumber industries. Among those who have actively aided Professor Record in securing such new material, mention must be made of Professor Emanuel

Fritz of the University of California. Specific gifts are mentioned under the section of this Report devoted to ACCESSIONS.

New and more representative specimens of lumber have thus been secured to take the place of defective boards formerly included. Many of the former exhibits have been retired from exhibition and the former black background in the wood cases is being replaced by the light buff color adopted for all of the exhibits. It is hoped to replace the pictures of foliage with reproductions of branches so that finally the wood cases will present the appearance of the hickory case illustrated in last year's Report (Plate XLVI, Vol. VII).

The exhibit of various valuable and unusual tropical woods installed last year in Stanley Field Hall was removed to make place for an exhibit of American mahoganies. Three species are on display: Cuban mahogany (*Swietenia Mahagoni*), Mexican mahogany (*Swietenia humilis*) of the Pacific coast of Mexico and Central America, and Peruvian mahogany (*Swietenia Tessmanii*). The Cuban and Mexican mahogany boards are beautifully figured. The Peruvian mahogany is not figured, but is nevertheless of excellent quality and similar to the Honduras species. All were donated for the Museum's wood exhibits by Ichabod T. Williams and Sons of New York. With the boards are shown branches of West Indian and of Honduras mahogany (Plate XV) obtained in the American tropics by the Acting Curator and reproduced in the Stanley Field Plant Reproduction Laboratories of the Department of Botany.

An eight-foot length of the trunk of a Guatemalan cow-tree, sent to the Museum by the United Fruit Company at the request of Professor Record, was installed as an exhibit in a special case in Hall 27, together with a jar of the latex or "milk," a sample of the wood, and photographs showing the tree in its natural habitat. The cow-tree was discovered only a few years ago, and it is confined to a small region near the coast of Guatemala. The "milk" looks exactly like cow's milk. Being of agreeable flavor, it is sometimes drunk by natives as a beverage.

Installation of the economic botanical exhibits in Hall 25 has been continued by Assistant Curator McNair. Attention was given especially to plant products used as food by man—nuts, starchy tubers, starches of economic importance, spices and condiments.

The method of installation followed has been described in the Annual Reports of 1926 and 1927 (pages 87–88 and 272 respectively).

The exhibit of starchy tubers and starches of economic importance has been limited to thirteen representative specimens. There are seven principal commercial starches: rice, wheat, corn, sago, arrowroot, cassava, and potato. Of these corn, wheat, and rice starch are shown in their respective places in the exhibit of grains and therefore are not included with the other starches derived from very different sources. These sources represented with samples of their starches are: potato (*Solanum tuberosum*), sweet potato (*Ipomoea Batatas*), East Indian arrowroot (*Curcuma angustifolia*), roots of the North American cycad, coontie (*Zamia floridana*), roots of taro (*Colocasia antiquorum*), breadfruit (*Artocarpus incisa*), Tahiti arrowroot (*Tacca pinnatifida*), yam (*Dioscorea alata*), West Indian arrowroot (*Maranta arundinacea*), Queensland arrowroot (*Canna edulis*), banana and plantain (*Musa paradisiaca* and *M. sapientium*), sago (*Metroxylon Rumphii*), and cassava (*Manihot utilissima*).

The importance of cassava starch in Brazil, the Guianas, and other South American countries is fully equal to that of the cereal grains, and as an especially interesting source of starch it has been shown in greater detail than the other starches derived from roots or tubers. The cassava exhibit includes the implements usually employed in its preparation—the curious cassava squeezer of the South American Indians, made from strips of the reed-like stems of a marantaceous plant (*Ischnosiphon*), and a strainer of the same material. Also shown are a lump of the starch as it comes from the squeezer, another as subsequently smoked for preservation, the various grades of the starch prepared in various ways, and the curious commercial package in which it is marketed in quantities—an adaptation of the South American Indian storage basket lined with green leaves—of about seventy-five pounds weight. Tapioca, the only form in which this article of food is known in the United States, cassava cakes, and “biscoitos” complete the exhibit. Much of this material was obtained by the Marshall Field Botanical Expedition to the Amazon.

In the starch exhibit it has been found desirable to represent some of the large roots and tubers by casts or models of the originals, since some of these, unfortunately, shrink as much as 75 per cent, besides discoloring on drying. Casts of various starchy roots and tubers, difficult to preserve dry, e.g. cassava, potatoes, yams, and several kinds of taro or dasheen, and also a model of a breadfruit

were therefore produced in the Stanley Field Plant Reproduction Laboratories for the starch exhibits.

In the exhibit of edible nuts it has been possible to divide those of Old World origin from those of the New World, affording an interesting comparison, each lot occupying one-half of an exhibition case in Hall 25. One entire case was also employed for the exhibit of spices and condiments, including ginger, turmeric, cardamom, vanilla, nutmeg, mace, cinnamon, cassia, bay leaves, poppy seed, black and white pepper, long pepper, black and white mustard, horse-radish, savory, peppermint, thyme, sage, marjoram, chile pepper, paprika, coriander, caraway, anise, cumin, cloves, allspice, tonka beans, and garlic.

There remain in Hall 25 a few empty cases, one of which is reserved for an exhibit of the principal comestible vegetables; another for beverages, such as matte, cassine tea, guarana, and cacao; still another for fermented beverages, while the last case in the hall will be devoted to an exhibit showing which of the principal food plants are of American origin.

In Hall 28 an exhibit of the distillation products from hard woods was revised, brought up to date and reinstalled. This consists of cord lengths of the principal woods used for distillation, viz., birch, beech, maple, and white ash, charcoal and twenty-seven products of distillation. These products are arranged in the order of a flow sheet in three series: above, the gaseous product, in the middle an ascending row of the volatile liquids showing the means of separating wood alcohol from acetic acid, and in the lower portion of the case a descending row of tubes containing the tarry, non-alcoholic liquids. The exhibit gives a clear conception of the substances obtained in the destructive distillation of hardwood, and the means of separation and purification. It is the first reinstallation accomplished in Hall 28, which will be devoted to industrial raw materials of vegetable origin and their products.

The Herbarium has increased rapidly in size and scientific value during the past year, and now contains more than 600,000 mounted sheets of plants. There are also on hand about 100,000 unmounted specimens, chiefly from the Old World, which are awaiting the necessary preparation before incorporation into the Herbarium.

There were prepared for insertion in the Herbarium, by gluing and strapping, 17,000 specimens, an increase of approximately 50 per cent over the preceding year. The employment of an assistant

to the regular plant mounter for three and one-half months made possible the mounting of an important accumulation of material from Mexico and Central and South America.

The Custodian of the Herbarium was on leave of absence during half the year, but during his absence the position was temporarily filled. All currently mounted specimens have been distributed promptly into the Herbarium. In addition, as a result of space made available by the installation of three new steel unit cases, it has been possible to distribute and thus make available for study and reference purposes the valuable Jeanpert fern herbarium, purchased a few years ago, and a large accumulation of Old World specimens, which, although mounted, had been stored temporarily, and were not accessible for consultation.

The curatorial staff has determined several thousand mounted specimens, thus making it possible to distribute them in the Herbarium, and adding numerous species not previously represented in the collections. The determinations of many sheets already distributed have been corrected. All mounted plant specimens in the Museum have now been placed in the Herbarium, where they are available for consultation, the only exception being the Peruvian collections, which are kept apart for study by Assistant Curator Macbride until completion of the flora of Peru, upon which he is engaged.

More than 30,000 mounted sheets were added to the Herbarium during the year, with a consequent substantial increase in its permanent scientific value. More than 20,000 of these specimens were from Mexico and Central and South America, the regions from which material is most desired by the larger American herbaria. The South American collections of the Herbarium of Field Museum have increased with remarkable rapidity during the past few years, and are now surpassed by those of few other institutions of the United States.

GEOLOGY.—In Stanley Field Hall a case was installed exhibiting fifty specimens of the volcanic products collected by the Marshall Field Expedition to New Mexico. These specimens illustrate different varieties of lava surfaces, volcanic bombs, lapilli, cinders, and other characteristic products of the region. Colored photographs and outline maps included in the exhibit serve to illustrate the subject further. This exhibit replaced that of the Baffin Land fossils collected by the Rawson-MacMillan Subarctic Expedition which

had previously occupied the case, and which was moved to be installed with the systematic series.

The large aquamarine and other gems presented by Mr. Richard T. Crane, Jr., were installed in Higinbotham Hall. The specimens of black opal and synthetic minerals obtained by purchase were also installed in this hall.

In Hall 34 reinstallation and change of backgrounds has been carried on as opportunity permitted during the year, and has been completed for all but eight cases. The cases reinstalled during the year include sixteen slope top cases and two upright cases of systematic minerals, two cases of ornamental minerals and four cases of meteorites. The contents of all these cases were removed, the interiors relined where necessary, all were repainted, and the specimens were reinstalled. For the cases containing the Chalmers crystal collection, a cloth lining was adopted as comporting better with the nature of the contents. A pyramid, similar to those used in some of the other upright cases, was made for the case of micas, the visibility and attractiveness of the contents being much improved thereby. So far as labels printed on buff cards were available, these were installed during the reinstallation of the specimens. A total of 2,148 specimens was thus relabeled. A number of minerals received during the year or earlier were also added to the exhibited series during reinstallation. These included forty-five specimens added to the Chalmers crystal collection, a series of Brenham meteorites, and several meteorite sections.

In Clarence Buckingham Hall the specimens were removed from eight cases not previously reinstalled, and the case interiors relined and painted. Of these cases, six were reinstalled, some rearrangement and change of specimens being carried on at the same time. Two of the reinstalled cases are devoted to volcanic products, one to dendrites, and three to specimens illustrating physical features such as rock jointing, faulting, texture, and markings. Two cases were changed in position to allow a better grouping of their contents to be made. The installation of the two remaining cases will complete the case reinstallation of the hall. In the section of the hall devoted to relief maps the model of Glacier Park acquired during the year was installed, space for this installation being obtained by changing the position of some of the other models.

In Hall 36 the work of changing backgrounds and reinstallation has been completed. Advantage was taken of the opportunity to make extensive changes in some of the exhibits, although most of

them were reinstalled with only minor alterations. Altogether, twenty-four cases were vacated during the year in this hall, the interiors of the cases were relined and painted, and the contents reinstalled. The reinstalled cases included seven cases of petroleum from various oil fields, three cases of petroleum-bearing rocks and sands, three cases of manufactured products of petroleum, one case illustrating refining of petroleum, two cases of oil shales, one case of coal-tar products, five cases of coals and mineral fuels, and two cases of clays and fuller's earths.

The silica collection, which was new last year, has been revised and enlarged so that it now occupies three cases. Because silica is the most abundant mineral of the earth's crust, occurs in a great variety of forms which bear little superficial resemblance to one another, and has many and important uses, it deserves more space than has hitherto been assigned to it. Accordingly, a collection occupying three cases is now shown in the place of the single one previously exhibited. One of these cases is devoted to a synoptic collection of the numerous varieties. This includes such apparently unlike minerals as rock crystal, chalcedony, onyx, opal, tripoli, and common sand. This is followed by specimens showing how silica occurs in both free and combined states in the rocks. In the same case is shown a small collection of gem and ornamental silicas. Following this is a collection illustrating recent, curious, and obsolete uses, among which are a glass-like flask blown from pure silica, smoky quartz partially fabricated by the Chinese into "smoked" spectacles, gun flints and aboriginal flint weapons.

A second case illustrates the commoner uses of moderately pure forms of silica. For example, silicate of soda, the silica from which it is made, and the board for cartons in the manufacture of which so much silica is used, are shown. This is followed by a series showing the composition of glass. Following this is a collection of glass sands from many parts of the world. This is followed by a group of varieties of ground silica, with some indications of its extensive uses as filler, in paint and in other ways. After this is a collection of abrasive silicas, including sandpaper, silica for scouring soaps and polishing powders.

The third case includes collections of the more impure silicas, principally in the form of sands which are used for common purposes. The largest group shown is that of molding sands. This group is accompanied by a miniature mold for cast iron. Core sands are accompanied likewise by a specimen of a core as used in foundries.

Fire sands, sands for sand-lime brick, building sands and others complete the collection. It is realized that anything like a complete collection along these lines would occupy far more space than could possibly be provided, but the collection in its present form should give a good general idea of the usefulness of this commonest of all materials.

The exhibit of clays and clay-like minerals has also been reorganized. Since it was thought that the former synoptic clay collection presented too technical an aspect, it has been simplified and condensed to occupy one case instead of the four it formerly filled.

The cement collection has also been completely reorganized on new lines. It now presents in one case in a synoptic way examples of each class of structural mineral cementing material which is now or has been in the past used in an important way. These substances range all the way from the clay mortars of primitive peoples to the recently devised alumina cements. Another case presents in more detail a collection of natural cement rock and the materials of which portland cement is made. The stages of manufacture and the composition of concrete made from portland cement are also shown. In this case the series begins with specimens of clay suitable for making mud plasters, cements and bricks as used by primitive peoples. This is accompanied by photographs illustrating the manufacture of sun-dried brick or adobe and of a house with mud walls. This is followed by an example of fire clay of a grade suitable for mortar to bind fire brick in furnaces where ordinary cements fail. Then comes an example of the asphalt extensively used in ancient times and still employed in large quantities as the cementing material for road and roof construction. This is followed by limestone and lime made from it. A specimen of hydraulic limestone illustrates the source of hydraulic lime, a material intermediate in properties between lime and cement. A specimen of gypsum calls attention to the large class of gypsum cements, including plaster of Paris and wall plasters. These are illustrated in more detail elsewhere.

The class of puzzolan or Roman cements, formerly of great importance, is represented by specimens of two kinds of volcanic ash from which such cements are made. This is followed by a single specimen of natural cement rock representing the formerly important class of natural cements. This is more adequately illustrated in the following case. Also the portland cements, treated in greater detail elsewhere, are represented in this synopsis by single specimens of limestone and clay. The magnesia cements, which are now becom-

ing more important than formerly, are represented by a specimen of calcined magnesite, their principal component. A specimen of bauxite calls attention to the new class of alumina cements, in which alumina, usually in the form of bauxite, replaces the clay of portland cement.

Additions have been made to the bentonite collections and the two cases containing bentonite, fuller's earth, and talc have been completely revised.

Two cases containing a model of a peat bog and the sulphur and magnesia collections were moved from the bridge connecting Halls 36 and 37 to Hall 36. Three other cases, temporarily empty, which were on the bridges connecting these halls, were also moved to Hall 36. In several of the cases containing coals and petroleums, maps showing the location of the deposits represented have been prepared and installed.

The mineral fuel exhibits are so extensive that the general relations of these fuels are obscured by the mass of detail. Consequently, a small synoptic exhibit showing the origins and relations of the mineral fuels has been prepared and placed adjacent to these collections. This synoptic collection consists of single specimens each of peat, lignite, coal, petroleum, natural gas, asphalt, oil shale, and shale oil. The labels explain the origin of each fuel and its relation to the others.

Seventy additional specimens not hitherto exhibited on account of space limitations have been added to the petroleum collections. Room for these was secured by the removal of an obsolete collection of lubricating oils. An interesting addition to these collections is a specimen of petroleum from the deepest producing well in the world. This specimen is also of interest on account of its composition, which is nearly three-quarters gasoline and almost one-quarter kerosene.

The large central case of refined oils has been reinstalled with new material replacing the older specimens as the latter were showing deterioration from age. The large specimens illustrating the refining of petroleum have also been renewed.

The oil-well model (Plate XII), partially completed last year, has been finished and is now installed as a part of the petroleum collection in Hall 36. It occupies about one-third of the length of a standard twelve-foot case, the rest of which contains specimens of petroleum. It extends vertically the whole height of the case. The

lower part of the model, resting on the floor of the case, shows an oil-bearing sand with its layers of salt water, petroleum and natural gas. This is shown resting on a bed of limestone below and with an impervious cover of shale above. Above the shale, a sufficient number of layers of rock are shown to illustrate the relation of the oil sands to the general geology of the region. The oil sand and the other rock beds are shown compressed into the fold which provides the inverted trough structure necessary for the accumulation of petroleum in commercial quantities. These rock beds are modeled accurately to scale according to data provided from a study by the Illinois State Geological Survey of the chips of rock obtained during the drilling of a well in the region represented, which is Lawrenceville, Illinois. The fold of the rock is modeled so as to be consistent with studies of the same fold at another locality where it is better exposed for study. The face of the model represents a face of rock as it would appear in section at the plane of the well. The texture, structure, and color have been reproduced in miniature in portland cement in as truthful a manner as possible. The scale of the model is five feet to the inch.

Above the model of the bottom of the well, a space of four inches is left vacant. This serves to indicate an amount of rock passed through by the well on its way to the oil which would require an additional thirty feet in the height of the model if it were represented. As this rock is not related to the oil sands in any way it has been omitted in order to reduce the model to practical dimensions. Above this four-inch gap the model represents about fifty feet of soil and gravel passed through in drilling from the surface downward. The surface is represented as being of a grassy, somewhat rolling topography. It blends into a painted background. On the surface are shown models of a derrick, tank, pumps, and other machinery. These include a representation of a well being drilled, with its derrick, drills, boiler, and engine. The well is shown as having reached about three-quarters of the way to the oil.

The model is fully explained by two framed labels extending down one side of it. The upper label describes the surface features and contains a photograph on which the details are numbered to correspond with the description in the accompanying text. On the label of the lower portion of the model, numbers are given corresponding to numbers on the frame of the model. The model has been carefully designed to illustrate simply and graphically the geological features upon which the underground accumulation of petroleum depends,

as well as the machinery used in Illinois for exploiting it. The success of the model in these respects may be inferred from the fact that photographs illustrating it have already been incorporated in a chemistry textbook and in an encyclopedia.

In Frederick J. V. Skiff Hall all the specimens were removed from four wall cases and the cases were newly lined and painted. Three of these cases are devoted respectively to synoptic gold, silver and lead ores, gold, silver and lead ores of the northwestern United States and the Appalachian region, and salts of potash. The contents of these cases were reinstalled with only minor changes. In the remaining case, which is devoted to gypsum, the exhibit was revised in order to permit introduction of a collection of large, well-formed, selenite crystals collected by the Marshall Field Brazilian Expedition. These were mounted on individual stands. These crystals range from two to three feet in length and are beautifully transparent. A few additions were made to other cases in this hall, the more important of which resulted in enlargement of the nitrate and salt collections, and introduction into the mica collection of a vermiculite and its roasted product, zonite. This latter is an elastic, porous material recently devised for insulating purposes. Most of the cases in this hall are of a different type from those in the other halls of the Department, so that the work of changing backgrounds in them must proceed along somewhat different lines. Partly for this reason, work on the cases of this hall, except for the four mentioned, has been deferred until reinstallation of cases of the other type has been completed.

The extensive changes and rearrangements which were inaugurated last year in Ernest R. Graham Hall have been continued, and realization of the plans for the general arrangement of the hall is rapidly being approached. Early in the year the construction of six built-in cases, three of which are placed at each end of the hall, was completed. These cases are designed for groups now in process of preparation. The cases comprise two large ones, twenty-five by fifteen feet in area, and four smaller ones, approximately sixteen by ten feet in area. The large cases have a vertical clearance of eighteen feet, the smaller, of ten feet.

In one of the smaller cases at the end of the series the group of Neanderthal Man, which had been in preparation by Mr. Frederick Blaschke for more than a year past, was installed (Plate III). Mr. Ernest R. Graham furnished the funds for its construction. This group contains five human figures representing a family of

this race of early man. The individuals included are a man about fifty-five years of age, a young woman holding a child, an older woman, and a boy of about ten years of age. The interior of the case is carefully modeled after a shelter once occupied by people of this race at Le Moustier, France. The scenery about the cave is represented by a painted background showing the valley of the Vezère River as seen from the vicinity. The scene is based on sketches made at the locality, with such modifications as the climate of the glacial period during which this race existed might have produced. The flow of water from melting glaciers is represented as having raised the river above its present-day height. Beyond the river patches of snow on the hills and scrubby vegetation indicate a subarctic climate. The surface of the hills is broken by escarpments which are changed little in outline from those of the present day. A small herd of reindeer is represented as feeding in the vicinity.

The man of the family is shown just returned from a successful hunt. A reindeer which he has slain with a stone ax is lying at his feet. Emerging from an inner portion of the cave is seen the woman with the baby in her arms. A small fire of sticks occupies a central place in the shelter. Beside it the older woman is cleaning meat and fat from a reindeer skin with a stone scraper, and near her the boy is gnawing on a bone. Flint chips from the Le Moustier locality, which were undoubtedly made by the occupants of the actual cave thousands of years ago, are strewn about on the floor.

Both the figures and the shelter or cave were carefully modeled in Europe by Mr. Blaschke, who accompanied the Marshall Field Archaeological Expedition to Western Europe in 1927 for this purpose. The cooperation of several of the ablest students of early man was enlisted in carrying on the work of modeling. These included Professor Sir Arthur Keith, President of the Royal College of Surgeons, London, Professor G. Elliot Smith of University College, London, and Abbé Henri Breuil, of Paris. The modeling was carried on, as far as possible, over original skulls and skeletons of individuals of the Neanderthal race which are preserved in European museums, or over casts of these remains. The head of the male figure was modeled over a cast of the La Chapelle-aux-Saints skull, and that of the child from the calvarium of the Neanderthal (Mousterian) child from Devil's Tower, Gibraltar.

The fidelity to nature, both of the human figures and their surroundings, has been generally recognized as of the highest order.



PAINTED CLAY FIGURE OF A WOMAN PLAYING IN A POLO MATCH

Stanley Field Hall, Case 7

China, Eighth Century A.D. Presented by Earle H. Reynolds

About one-half actual size

The group from the first has attracted wide attention and proved of great public interest. It is the first restoration of human figures of this race ever attempted, and its execution has won high praise. Photographs and descriptions of the group have appeared in newspapers and periodicals in nearly every country in the world, and its popularity and interest have been widespread.

Work on the Carboniferous forest group which is to occupy the large case at the south end of Graham Hall was carried forward during the year in the Stanley Field Plant Reproduction Laboratories of the Department of Botany. As expected, it has proved a large undertaking, but a gratifying amount of progress has been made. All the trunks of *Sigillaria*, seven in number, required for the group have been completed. Notable among them are two handsome restorations and a simpler stem, five feet or more in diameter at the base, which serve to give an idea of the great size attained by the dominant vegetation of the period. These *Sigillaria* trunks, together with the *Lepidodendron* stems completed last year, have been placed in the case provided for the group. Seven of the *Calamite* stems have also been placed in position in the group. Because of peculiarities of their construction, the latter had to be assembled in the places they are to occupy, being built up *in situ* from sections previously prepared.

One especially interesting feature recently completed for the group is an overturned stump of *Sigillaria* showing the dichotomous branching of the underground stems or *Stigmaria* with their processes. In point of volume and amount of labor expended on material for the group the foliage for the large fossil "horsetails" (*Calamites*) takes first place. This foliage was cut and pressed from sheet celluloid by means of steel dies made during the previous year. These leaves were then assembled on branches. A fragment of a branch of *Annularia* so prepared is probably the first attempt ever made at a three-dimensional restoration of this common fossil plant of the Carboniferous Period. Work on foliage for the *Lepidodendron* restorations is under way, as is also preparation of the fruiting cones, which in some species were borne at the tips of the branches, similarly to the small present-day representatives of this group, but in other species in clusters on the stem, as in some of the modern cauliflorous trees.

Of the series of mural paintings, presented by Mr. Graham, and designed and executed by Charles R. Knight for Graham Hall, six more were received and placed in position on the walls during the

year. The subjects of these paintings are: *The Great Irish Deer*, *The Mammoth and the Woolly Rhinoceros*, *The Great Ground Sloth and the Giant Armadillo* (Plate VIII), *The Great Dinosaur*, *The Primitive Whale*, *Zeuglodon* and *Marine and Flying Reptiles*. Four of these are twenty-five by nine feet in size; two are eleven by nine feet.

The construction of the large cases at the north end of Graham Hall required some readjustment of the cases and floor mounts previously occupying this space. For this purpose six cases and eight floor mounts at the north end of the hall were moved and rearranged. Three of the large floor mounts were transferred to the center of the hall, and iron railings were erected about them to prevent their being injured or handled by visitors. In two of the cases specimens, prepared during the year, of the South American fossil mammals collected by the Marshall Field Paleontological Expedition to Argentina and Bolivia were installed. Important among these are skulls of the great ground sloths from the Pliocene and the Pleistocene formations of Argentina and Bolivia. These skulls range from ten to thirty-five inches in length. Those now on exhibition are members of the genera *Myiodon*, *Scelidotherium*, *Glossotherium*, *Pronothrotherium*, *Megatherium*, and *Scelidodon*. A number of these skulls belong to individuals of which entire skeletons, or the greater parts of them, will later be assembled and exhibited. Additional notable specimens placed on exhibition in this series are skulls of other large South American mammals, including the *Toxodon* and *Astrapotherium* of lowland habits, the lesser *Adinotherium* and *Proadinothereum*, and the slender and agile *Theosodon*, progenitor of a strange, camel-like race which inhabited the more arid regions of South America.

Transfer of the invertebrate fossils from black to buff tablets has been carried on almost continuously through the year, a total of 7,956 specimens having been so transferred. This transfer involves careful removal of the specimens from the old tablets, cementing of the printed buff covers to the tablets, and refastening of the specimens upon them. As fast as the tablets were prepared they have been reinstalled in the cases, redecorating of the case interiors having meanwhile been carried on. From eleven cases of these fossils specimens were removed, the cases were painted, and eight cases have been reinstalled. These completed cases include one of Pennsylvanian plant fossils, three of Silurian, two of Ordovician, and two of Devonian age. In addition, about 800 Cretaceous and 2,500

Tertiary invertebrate fossils were remounted and installed in the cases devoted to those periods.

In connection with the remounting of the invertebrate fossils, careful identification of all specimens was carried on by Mr. Roy in order to provide the latest nomenclature. He revised the labeling of 8,000 specimens in this manner during the year.

A stump, eighteen inches in diameter, of the large Devonian seed-fern, *Eospermatopteris*, was installed on a base adjacent to one of the Devonian cases. Installation of labels has been carried on in the hall as fast as they were received from the printer, with the result that the relabeling of this hall is now nearly complete. The total number of labels installed in the hall during the year is 3,659.

A new form of labeling has been introduced which is of much service in indicating the geological period and stratigraphic position of the contents of each case. These labels show the life eras or geological periods in order, with estimates of their age and duration in years according to the eminent authority, the late Professor Joseph Barrell, of Yale University, and the characteristic forms of life which existed during each period. One such label is placed in each large case next the aisle, with the position in the geological series of the contents of the case indicated by a red star on the label. Another label, within the case, carries out the classification in further detail, giving the several subdivisions of the geological period, and the better known occurrences of the formations. The fossils recorded are designated first by the family name in common or descriptive terms, with the scientific name following in parenthesis. Under the family name are given names of the genera characteristic of the formation under which they are listed. The genera of fossils represented by specimens in the Museum collections are further designated by asterisks before the generic names.

In Room 107, adjacent to the paleontological laboratory, a series of twenty-four steel storage cabinets, designed in part to receive specimens of large size and great weight, was installed.

In order to complete the work of segregating and arranging the unprepared specimens or those reserved for study, the paleontological collections stored in Room 101 in some 600 trays were rearranged and condensed. The entire series was then relabeled according to number of specimen, year collected, geological age, and locality from which collected.

In the paleontological laboratory the work of preparing the collections of South American fossil mammals has gone forward as rapidly as possible. During the year four candidates were given trial as preparators, and two of them continued in service at the end of the year. Sixty-five specimens have been prepared, of which number twenty-one have been mounted and placed on exhibition.

Associate Curator of Paleontology Elmer S. Riggs has given much time and attention to a thorough revision of the field bundles and other specimens in storage in order to insure their preservation and make them readily accessible. The collection of fossil mammals from northern Argentina, amounting to more than 500 parcels, was removed from the storeroom on the ground floor, poisoned by the use of carbon tetrachloride, rewrapped in burlap applied with plaster of Paris, and rearranged in the storeroom.

The increase in the force of preparators necessitated devoting two additional rooms to their work. For this purpose Rooms 100 and 105 were diverted from previous uses, and some needed equipment was provided, including storage racks, a gas stove, a portable electric drill, tables and various hand tools. Room 105 was divided by a partition so as to provide an emergency exit from the Roentgenological Laboratory, and at the same time retain space for preparatory work and study of specimens of vertebrate fossils. The office of the Associate Curator of Paleontology and all of the work-rooms were cleaned and painted.

In the laboratory of invertebrate paleontology, Room 110, a motor-driven, combined rock-cutting and grinding machine was installed. This equipment enables the internal structures of fossils, upon which their classification is now so largely based, to be brought to view and Assistant Curator Sharat K. Roy has already obtained valuable results through its use. Preparation of the Frobisher Bay fossils collected by the Rawson-MacMillan Subarctic Expedition has been nearly completed, 290 specimens having been worked out. These are now being studied.

The chemical laboratory has been in use most of the year except for times when it was necessary to suspend operations pending necessary renovations of the walls, ceilings and ventilating systems. The ventilation of the hood and the removal of the fumes generated there have been improved by replacing corroded iron conduits and improving their design. A fan has been added to provide a mechanical exhaust, and additional equipment is being prepared which it is hoped will furnish further needed ventilation by means of the



GROUP OF INDIAN RHINOCEROS

William V. Kelley Hall of Asiatic Mammals
James Simpson-Roosevelts Asiatic Expedition

Reproduction in cellulose-acetate by Leon L. Walters. Background by Charles A. Corwin
About one twenty-second natural size

same exhaust fan. Falling of rust from the iron roof of the hood, which had become so serious as to put the hood out of commission, has been temporarily remedied by a coat of tar. The walls and ceilings of the laboratory, which, owing to incomplete finishing, produced dust which interfered with accurate work of a delicate nature, have now been painted. Obsolete types of heating apparatus have been replaced by the addition of three electrical hot plates and an electric flask heater. These have much expedited the work of the laboratory. The instrument and control panel for the motor generator set used for the Fink treatment of bronzes have been remodeled so as to use the heavier currents required by the larger specimens that are now being treated.

Complete analyses have been made of three meteorites, two of which, the Lafayette and Tilden, were stone, and one, the Houck, was iron. Many partial qualitative determinations needed for identification of specimens have been made as occasion arose. Revision of the petroleum collections has necessitated much work in cleaning and refilling the bottles in which the oils are exhibited. This work has been done in the laboratory. Some experimental work also is being carried on in this laboratory to determine the best type of equipment for a proposed fluorescent mineral exhibit. This is being done by means of an iron spark-gap apparatus which has been assembled there.

One determination of the heat value of coal for the Museum boilers has been made. The value of ethylene dichloride-carbon tetrachloride as a disinfectant for Museum cases was also investigated. This work centered upon tests of inflammability and determination of such features as weight of vapor, speed of evaporation and similar properties as compared with those of the carbon disulphide formerly used. This investigation was necessary to prevent mistakes when its use was substituted for that of the insecticide earlier employed. Minor investigations, such as determining the strength of glycerine and alcohol solutions, have been made as occasion arose. An investigation was made into the probable durability of a new wall covering for use in the lavatories and in the boiler room.

Analyses were made of an ancient Egyptian medicine and of five Peruvian bronzes for the Department of Anthropology; also sixty-one ancient Egyptian weights were determined in terms of metric units. The treatment of ancient bronzes by the Fink process has been continued through the year and hundreds of bronzes have been

thus restored. This work has taken much of the time of Associate Curator Henry W. Nichols, but the situation seemed to require that it should be done at once since these bronzes are very valuable and many would be irreplaceable. The coating on many of them was of a corrosive character and was, slowly in some cases, and rapidly in others, destroying the bronze. Consequently, immediate treatment was called for. The Associate Curator was assisted in this work by Mr. John G. Prasuhn of the Department of Anthropology, upon whom also the preparation of the treated specimens for exhibition has devolved. The treatments have been uniformly successful. There are, however, a number of specimens in the last consignment from Kish which are in such condition that they will require the most careful attention. Before the Fink treatment was adopted no way was known to save such material.

In the employment of this process in the laboratory no important modifications have been made. Some additions to the equipment, however, have made the handling of the process more convenient. It has also been possible to speed up the treatment for certain classes of material which are not in too bad condition. On some classes of material it has been possible to preserve much of the original patina while destroying all malignant matter and removing the thicker incrustations. There has also been developed an after-treatment which provides the specimen with a thin, natural patina without the use of chemicals or electricity. This patina is sufficient to take away the new look of the treated bronze, and provides a base upon which a thicker patina may form in time.

Besides the use of the Fink process, a new, strictly chemical method of rendering malignant patina inert has been devised in this laboratory. It has been applied to a number of bronzes with apparently successful results, although five or ten years must elapse before it is positively known that the cure is permanent. This treatment is intended for those cases, which are frequent, in which the malignant patina is confined to the surface. The process is based upon reactions that, so far as is known, have never been employed for the purpose before. Since nearly, if not quite all, the corrosive patinas encountered owe their injurious action to some simple chloride compound which has the property of continuously renewing itself, the new process consists of fixing the chloride in inert form by treatment with a silver salt and then fixing and rendering inert any corrosive by-product of the first treatment. For this purpose a weak solution of sulphate of silver in distilled

water is prepared. The most suitable strength for this has not yet been determined, but the exact strength is not important. The solution is applied to corroded spots or spread over the affected area with a small camel's-hair brush. After about thirty seconds the surplus liquid is removed with blotting paper and a second solution is applied. This second solution consists of barium hydroxide dissolved in distilled water. It does not keep well and must be prepared freshly each time it is used. The barium hydroxide powder must also be kept at all times hermetically sealed. A thorough washing completes the treatment. It should be noted that where, as is the case with many of the bronzes, the malignant matter penetrates throughout the specimen, the above-described treatment will not suffice.

ZOOLOGY.—Further marked advance was made during the year in the preparation and installation of habitat groups of mammals. Five large groups with painted backgrounds were completed, and one of smaller size, open on four sides. Of the large groups, one was added to William V. Kelley Hall and four to the Hall of American Mammal Habitat Groups. The animals represented are the Indian rhinoceros, polar bear, Alaska Peninsula brown bear, American bison, and musk-ox. In addition, a small group of Abyssinian dassies or coney was finished and placed in Carl E. Akeley Memorial Hall.

The Indian rhinoceros group (Plate XIX) is a large and striking group prepared from material obtained by the James Simpson-Roosevelts Asiatic Expedition of 1925-26. It includes two specimens, male and female, reproduced from animals shot in Nepal by Mr. and Mrs. Kermit Roosevelt after the main part of the expedition's work in Turkestan and the Himalayas had been concluded. They were prepared by Taxidermist Leon L. Walters, by means of the process originated by him of reproduction in cellulose-acetate. They furnish a further demonstration of the superiority of this process for the exhibition of large, practically hairless mammals. One animal is shown standing on the reedy bank of a river, while the other is wallowing in shallow water near-by. The painted background, executed by Staff Artist Charles A. Corwin, represents a sluggish river meandering through grassy swamps with low hills lightly clad with small trees and bushes in the distance.

Of the four large mammal groups added to the Hall of American Mammal Habitat Groups, two are wholly new and two are based on reinstallation of animals formerly exhibited in floor cases without

backgrounds. Their completion makes possible the opening of a part of the west half of the hall for which other groups are now in preparation. The brown bear of the Alaska Peninsula, giant among extant bears, is shown in a group representing a scene in Pavlof Bay, Alaska Peninsula. The specimens were obtained by the John Borden-Field Museum Alaska-Arctic Expedition and the Alexander H. Revell-Field Museum Alaska Expedition of 1927. A large male bear stands at one side, while his mate, with her back turned to him, is busily engaged in fishing for salmon in a small stream. Two partly grown cubs are playing with the fish which their mother has scooped out of the water. The background shows the symmetrical volcanic cone and snowy slopes of Mount Pavlof. The group was prepared by Taxidermists Julius Friesser and Arthur G. Rueckert, with painting by Staff Artist Corwin.

The polar bear group, presented by Mr. Frederick H. Rawson, stands opposite the group of brown bear, and completes a quadrangle with the earlier groups of glacier bear and grizzly bear, so that from the center of the hall four groups of American bear are seen at once. A magnificent male polar bear of exceptional size and quality, descending the inclined surface of a block of ice, forms the outstanding feature of the group. Below him a female is crouching on the ice and two small cubs are playing about her. An Arctic scene of snow and ice, painted by Mr. Corwin, rises behind. This group also was prepared by Messrs. Friesser and Rueckert.

The groups of bison and musk-ox (Plates V and X) stand opposite each other, occupying the largest spaces in the hall. Both were produced by using animals formerly in open four-sided floor cases. The group of musk-ox includes seven animals originally mounted by Carl E. Akeley. They stand variously disposed on moss-carpeted tundra. A bleak, treeless plain lies behind them, and low hills with light patches of snow rise in the distance. A large bull occupies a prominent position on a slight elevation, and females with younger animals are gathered near-by, among them two small calves idly nuzzling each other.

The bison group contains seven animals ranging from large bulls to partly-grown calves, all in the full, heavy coat of late fall or early winter. They are represented as coming down a clay embankment over well-trod trails to the bed of a prairie stream beside which a few small cottonwood trees stand. The effect of a large herd in the vicinity is given by numerous animals painted on the background by Mr. Corwin, some slowly filing over the prairie

as if leaving the watering place, and others crowding over the edge of the embankment on their way to it. The specimens were mounted and the reinstallation effected by Mr. Friesser. The group was presented by the late Arthur B. Jones, a former Trustee of the Museum.

In addition to the completion of these mammal groups, much progress was made with others which are under way. A group of the South American marsh deer is in the final stages of preparation at this writing. All the animals are mounted and only details of the accessories remain to be done. A group of the great anteater of tropical America also is well advanced, and preliminary sketches and models have been made for groups of tapir and guanacos. Progress on the sea lion group for the Marine Hall was interrupted by the absence of Taxidermist C. J. Albrecht in Africa, but several of the smaller animals have been completed, and the others are in such stages that the completion of the group in the coming year may be expected.

Taxidermist Walters has devoted himself during a large part of the year to a reproduction of a white rhinoceros from a specimen collected by the Conover-Everard African Expedition of 1926-27. This work is nearing completion and the finished product, which promises to be a magnificent piece, will doubtless be placed on exhibition early in 1930.

In the systematic exhibit of North American birds, one case with two screens was installed early in the year, showing marsh birds and shore birds, with seventy-six specimens of sixty-six species of cranes, rails, plovers, sandpipers, and their allies. These were the work of Taxidermist Ashley Hine, who has now finished many of the larger American birds and is beginning work with some of the numerous smaller forms. A few foreign birds from recent expeditions were mounted also, and are awaiting installation.

After the return of the Cornelius Crane Pacific Expedition, a temporary exhibit of some of the material obtained by it was installed in four cases and placed in Stanley Field Hall. This included specimens of mammals, birds, and reptiles, together with a series of water-color paintings by Mr. Walter A. Weber, artist of the expedition. The paintings have since been removed.

The west half of Albert W. Harris Hall, in which reptiles and amphibians have been exhibited, was completely reorganized during the year, mainly by Associate Curator William J. Gerhard with

the assistance of Mr. Walters and Mr. Emil Liljeblad. Material in old cases was reinstalled in six rectangular cases of medium height, two being devoted to crocodilians, two to turtles, and two to lizards and snakes. Great improvement was brought about by remounting specimens on suitable natural bases, corresponding to the practice in the halls of systematic mammals and birds.

One "A-case" was reinstalled, and a second, containing new models prepared in cellulose-acetate and cellulose-nitrate by the Walters process was put in place beside it. The new material represents twenty-seven forms, among which may be mentioned local salamanders, North American rattlesnakes, and an interesting demonstration of the poison mechanism of rattlesnakes shown by combining models and actual skeletal parts.

The work of reinstalling fish exhibits in the east half of Albert W. Harris Hall, begun in 1928, was completed, all backgrounds now being light green in color and the arrangement much improved. Nine cases were thus reinstalled.

Incoming material from the numerous expeditions occupied the Staff much of the time during the year. Although permanent arrangements were still impossible for some classes of specimens, the storage of new accessions was greatly facilitated by recent additions to equipment.

Sixteen new steel cabinets and fittings for mammals, and sixteen for birds, were received and immediately put into use. In the division of birds a very extensive rearrangement was made. All trays were labeled as to contents, and, so far as facilities would permit, related groups of birds were brought into proper sequence and juxtaposition. The same was done with mammals and, although it is still necessary to use many of the small cans, a general system is sufficiently established to make possible the addition of new steel cabinets in small numbers from year to year without serious disturbance of order.

Ninety-six steel cabinets fitted with shelves and, to some extent, with drawers on roller bearings, were placed in the west corridor of the fourth floor of the Museum for the storage of large skulls and other osteological material. These provide space for the systematic arrangement of this material which has been relatively inaccessible for some time. Much osteological material remains in rough, unprepared condition as received from the collectors. To care for this and to bring all collections of this kind into usable condition in

the new cases, a modern cleaning and degreasing plant was installed on the ground floor of the building. This is furnished with three seventy-gallon tanks of galvanized iron, having three large outlets, hot and cold water, thermometer, and electric lighting and ventilating equipment. A degreasing tank is being added, and it is hoped that in the near future a large accumulation of uncleaned skulls and skeletons may be prepared and made available for use.

The osteologist has cleaned skeletons of hippopotamus, elephant, seal, walrus, bison, and lion, and skulls of crocodiles, African antelopes, rhinoceros, brown and polar bear, and seals. In addition he has cleaned 578 skulls of small mammals, mainly those of very small size, such as bats and shrews, requiring especial care and skill. Six hundred and ninety-eight skulls of small mammals were cleaned by an outside concern.

Improvements involving extensive construction in the north end of the fourth floor of the building were completed, which greatly increased efficiency in the taxidermists' shop. A gallery was carried across the entire north gable and three spacious rooms constructed on it for the storage of the entire collection of skins of large mammals, previously stored in a special room on the ground floor. Below this, in the northwest corner, a room was built for the reception of heavy machines used in skin dressing, and east of this steel shelving was provided for taxidermists' supplies, tools, and miscellaneous storage. On the east wall a special fireproof room was built for chemicals and other materials requiring special protection. With these changes, the Museum's main taxidermists' studio becomes a model of comfort, convenience, and efficiency.

THE N. W. HARRIS PUBLIC SCHOOL EXTENSION

The Department of the N. W. Harris Public School Extension completed its seventeenth year of operation in 1929, continuing its work of extending the influence of the Museum into the schools of Chicago by furnishing them with cases containing economic and natural history exhibits. Since the establishment of the Department in 1912, there have been prepared 1,123 traveling exhibition cases. Fifty-three were completed in 1929 (examples—Plates VII, XVI).

In the preparation of these cases high standards have been maintained. They are made sturdy enough to stand frequent transportation and constant handling by children, and yet they are light enough for a child to carry. The cases must not only be true to nature but they must be attractive.

The collecting of the specimens used and the making of photographs for backgrounds, as well as the actual preparation of the cases, is done by the Staff of the Department. During the past year some particularly fine material has been collected for habitat groups of local birds. The type of case used is considered ideal for extension purposes and is widely copied by other museums. Some slight improvements in the structure of the case were made in 1929.

The regular service of two cases to each school, changed every two weeks, has been maintained for 408 institutions. The two motor trucks of this Department during 1929 traveled more than 12,000 miles in this service. As the drivers deliver the cases to the desired location within each building, a complete service is maintained entirely free of expense to the recipient institutions.

The Chicago public schools alone have more than 470,000 pupils and 13,000 teachers, and as thirty-three other institutions are on the regular routes of this Department, the daily attendance served by these cases is more than a half million people. Each case remains in each school two weeks and every student has the opportunity of seeing it. Forty different cases reach each school during the year.

In addition to this regular service, two cases were sent to the Ohio State Fair, and special displays of from ten to forty-three cases each were made in Marshall Field and Company's retail store, in the Outing and Recreation Bureau's Adams Street display windows, at the Boy Scout Exposition, the Flower Show at the Hotel Sherman, Camp Algonquin, the Navy Pier, the Illinois State Fair, and the International Live Stock Exposition. Each of these displays reached thousands of people.

During the period under review the Acting Curator, Mr. Cleveland P. Grant, visited 126 schools to obtain a better knowledge of the needs and desires of the schools for visual education in natural history, and to give instruction as to the better use of the cases.

ART RESEARCH CLASSES

The year 1929 was marked by further advance in the work of the art classes conducted in Field Museum in cooperation with the Art Institute of Chicago. A new classroom better suited to the work carried on was provided by the Museum. This room has all north light, which is the best light for an art studio. The instructor, Mr. John Gilbert Wilkins, now has a private office where materials



CASSAVA, A COMMON FOOD PLANT OF SOUTH AMERICA

Hall of Plant Life (Hall 29)

Reproduced in Stanley Field Plant Reproduction Laboratories

One-twelfth natural size

and data may be kept, and adjacent to it is a large cloakroom for the students.

The Art Institute has given the class a complete motion picture outfit, making possible study of animals and birds in normal and slow motion pictures. This is a valuable supplement to the study of mounted specimens, giving opportunity to observe the action of body, limb, and muscle.

The Institute has also furnished modeling stands, where students may experiment with the animal in the round as well as in illustration and design. Students have already produced sculpture of high professional standards, and reproductions of some of their work are being sold by Marshall Field and Company Wholesale.

DIVISION OF PUBLIC RELATIONS

The publicity obtained through various media for the activities of Field Museum has in 1929 again exceeded that of all previous years, continuing the increase which has been noted annually ever since the institution adopted a definite program for strengthening its relationships with the public.

The principal phase of the Museum's publicity efforts, that of distribution of information through the daily press, was developed in 1929 to the point where the number of articles prepared at the Museum and published in the newspapers averaged more than one for every day of the year, exclusive of articles coming from the pens of outside writers or prepared by members of newspaper staffs. As in the past, while concentrating chiefly on publicity in the papers of Chicago and vicinity, the Museum has obtained nationwide attention for its activities through the cooperation of news agencies, and the more important news of the institution has been internationally circulated. Clippings from all over the world, in many languages, have been received, testifying to the fact that Field Museum's accomplishments are known wherever people read.

In addition to newspaper publicity, many important magazines and other periodicals have devoted much space to the Museum. Still further publicity has been received through advertising space generously placed at the Museum's disposal by various organizations; through radio broadcasting; through motion picture newsreels; and through direct advertising efforts conducted by the Museum in distributing direction folders and other printed matter designed to attract visitors.

NEWSPAPER PUBLICITY.—The Division of Public Relations released a total of 375 news stories during 1929, or an average of more than seven each week. Also, by the inauguration of a new system of circulating very brief notes calling attention to older exhibits and other Museum matters, used in the newspapers as “fillers,” an additional 209 items were released and published. Thus the total of notices, including regular articles and short items obtained for the Museum by its own direct efforts, was 584.

Copies of this publicity matter were furnished to the seven principal daily newspapers of Chicago; to some sixty community and neighborhood papers published in the city; to more than fifty Chicago foreign language newspapers; to about sixty suburban newspapers covering the principal suburbs, cities and towns within a 100-mile radius of Chicago; to all the principal national and international news agencies; and to the Springfield bureau of the Associated Press for its special service to newspapers throughout the state of Illinois, which is in addition to the national distribution effected through the Chicago office of the same organization.

Photographs accompanied many of the stories, prints from 358 negatives having been released by the Museum. Copies of these photographs were furnished to a list of twenty-five leading newspapers and news photograph agencies, through which hundreds of additional copies were distributed to newspapers all over the world. A great amount of space has been given to Museum pictures in newspapers publishing rotogravure sections, and, as this type of reproduction is so far superior to ordinary news photographs, it has undoubtedly been of benefit in providing the public with a clearer idea of what the Museum is and what it does.

The contract with the *New York Times* and its subsidiary company, Wide World Photos, whereby the photographs resulting from certain Field Museum expeditions are syndicated nationally, was continued as in past years.

As usual, the news from the Museum has frequently provoked editorial comments in many important newspapers, including all those of Chicago, many in other American cities, and even some abroad, a notable instance being the *London Times*. One editorial feature column which is syndicated among newspapers from coast to coast with a total of about twenty million readers, has frequently given space to comments on Field Museum activities during 1929.

The Museum's releases ranged from the “filler” items above mentioned, of fifteen to twenty-five words, up to full column articles,

the majority of the regular news stories running from about one-half to two-thirds of a column. Every story released was printed in several Chicago newspapers, and many in all; and the majority received extensive space throughout the country. Frequently these releases have been expanded by newspaper staff writers for full-page Sunday feature articles.

For their generous cooperation which has contributed so greatly to the success of the Museum's publicity efforts, grateful recognition is herewith accorded the *Chicago Tribune*, *Chicago Daily News* and *Chicago Daily Journal*, which recently merged, *Chicago Evening Post*, *Chicago Herald and Examiner*, *Chicago Evening American*, *Chicago Daily Illustrated Times*, *Chicago Journal of Commerce*, and the national and international news agencies, such as the Associated Press, United Press, International News Service, Universal Service, and Science Service.

As an indication of the extent of the newspaper publicity received, the records show that an average of 2,038 clippings of articles mentioning the Museum was received each month in 1929. This number represents only a part of the space given the Museum, as no complete coverage of even the English language newspapers is available, and certain groups, such as the foreign language papers, are not covered at all by the clipping bureaus. The total number of clippings received for the year was 24,457.

PUBLICITY IN PERIODICALS.—The Museum and its activities have again been the subject of many special articles which have appeared in general and popular magazines, trade journals, scientific publications, and other periodicals. Some of these were prepared at the Museum on the request of editors, and others were written by outside writers, usually illustrated with photographs furnished by the Museum and based on data supplied by the Staff. Among the more important publications in which this material has appeared are *Scientific American*, *Chicago Commerce*, *Science*, *Popular Mechanics*, *Popular Science*, *Americana Annual*, *International Year Book*, *Science News Letter*, *Museums Journal* (London), *Chicago Visitor*, *Chicago Beautiful*, *Field and Stream*, *St. Nicholas*, and *Chicago* (a book).

ADVERTISING.—The Museum has been fortunate in receiving, free of charge, advertising space in various media, as in previous years. The Chicago Surface Lines continued its generous coopera-

tion by printing at its own expense, and displaying in the street cars, colored overhead posters calling the public's attention to some of the Museum's striking exhibits. The Chicago Rapid Transit Company and associated interurban lines, including the Chicago, North Shore and Milwaukee Railroad, the Chicago, South Shore and South Bend Railroad, and the Chicago, Aurora and Elgin Railroad, distributed some 65,000 Field Museum descriptive folders among their patrons, and displayed Museum posters in stations of the Elevated Lines. In the Outing and Recreation Bureau maintained in the "loop" district jointly by these and other interests, a large display window near a busy street corner was for several weeks devoted to an exhibition of Museum material and placards urging the public to visit the Museum. The Chicago, North Shore and Milwaukee Railroad again allotted space throughout the year to Museum exhibits and lectures in its "This Week's Events Along the North Shore Line" posters displayed at all stations between Chicago and Milwaukee. The Illinois Central Railroad and the Chicago and North Western Railway displayed at their city and suburban stations placards announcing Field Museum lecture courses. These posters were also displayed in Marshall Field and Company's retail store and in libraries, schools, and other institutions. Practically all railroads entering Chicago widely advertised the Museum in connection with excursion trips they conducted from various points in the middle west. Approximately 80,000 Field Museum descriptive folders (in addition to those distributed by the Rapid Transit and associated companies) were distributed by the Museum and cooperating agencies, including practically every railroad and lake steamship line entering the city, and the principal hotels, clubs, travel bureaus, and department stores. The officers and delegates to many of the important conventions held in the city were also furnished with supplies of these folders.

The Clyde W. Riley Advertising System, publishers of *The Playgoer*, the magazine-program used in practically all Chicago theatres (exclusive of motion picture houses) continued the courtesy it has extended for several years of giving the Museum from a half-page to a page of advertising space in each program. The Museum also received, as in previous years, a free page advertisement in the programs of the Chicago Civic Opera Company. The Museum was advertised also in the house organs for customers and employes published by the Stevens Hotel, Marshall Field and Company,

Commonwealth Edison Company, People's Gas Light and Coke Company, Montgomery Ward and Company, Illinois Bell Telephone Company, and other firms, and in folders and other advertising matter issued by many railroads, lake steamship companies, and hotels.

During the International Live Stock Exposition special cooperative publicity and advertising was arranged between the management of that enterprise and the Museum.

RADIO.—Further publicity for Field Museum was contributed by local radio stations which broadcast Museum news and arranged for talks by members of the Museum Staff. Among stations which cooperated were WLS, the *Prairie Farmer* station which in cooperation with the *Chicago Daily Journal* broadcast a series of talks by the Director and various members of the scientific staff; WCFL, the Chicago Federation of Labor station; WMAQ, the *Chicago Daily News* station, which broadcast several travelogue talks by Museum speakers, illustrated with pictures published in the roto-gravure section of the paper on simultaneous dates; and the radio stations operated in conjunction with various other Chicago newspapers or under the auspices of other organizations of various kinds.

NEWSREELS.—Field Museum activities were also brought before the public in motion picture newsreels. Among these were the newsreels of the Paramount Film Corporation, M-G-M-International Newsreel, *Chicago Daily News*-Universal Newsreel, and others.

EDITORIAL WORK.—A large amount of editorial work was performed by the Division of Public Relations. Plans were completed for a monthly bulletin which will announce, report and record all Museum activities. It will be distributed regularly to Members of the Museum, subscription being included as part of all memberships. Preparation of the first number of the paper, which is called *Field Museum News*, was under way at the close of the year, with publication scheduled for the first week of January. The Division also performed editorial work on new catalogues of the Museum's publications, which are soon to be issued, and on various other printed matter.

DIVISION OF PRINTING

The output of the Division of Printing during 1929 exceeded by far that of any other year, both in publications and in labels and miscellaneous matter.

In order to replace more rapidly the black exhibition labels with the more legible new style of buff labels, three more printers were added to the Staff of the Division at the beginning of the year. As a result the Division turned out 15,000 more exhibition labels than in the previous year.

To make better progress on the publications for which manuscripts had accumulated, four additional printers were employed in September, three of them being assigned to night service. By means of this increase in the force the Division was able to issue 24,156 copies of books in the regular publication series, a number exceeding that of any other year, and double that of the preceding twelve months. There was also a substantial increase in the number of leaflets printed.

The quality as well as the quantity of work that could be done by the Division was given consideration. To make the Museum's printed matter as free of typographical errors as possible, an efficient proofreader was employed. A comparatively quiet working space being essential for the proofreader, the southeast corner of the room used by the Division on the third floor was partitioned off for office purposes.

The Miehle vertical press, which was installed a year ago, has proved to be a most valuable addition to the Division's equipment. It has been the means of turning out a better quality of printing, and has helped greatly to increase the production of the Division.

In 1929 the Division's equipment was enlarged by the addition of a combination type-cabinet unit needed to facilitate the work of the increased Staff.

The following publications, with contents totaling 1,726 pages, were printed and bound during the period under review:

Publication number	Number of copies
254—Contribution to Paleontology	1,275
255—A Contribution to the Ornithology of Brazil	1,016
256—Annual Report of the Director for the Year 1928	7,661
257—The Birds of the Neotropical Genus <i>Deconychura</i>	1,068
258—Flora of Barro Colorado Island, Panama	1,040
259—Spermatophytes, Mostly Peruvian	1,100
260—The Mineral Composition of Sands from Quebec, Labrador and Greenland	1,611

261—A New Rodent from the Galapagos Islands	1,105
262—Contents and Index to Volume XII	1,085
263—Birds of the James Simpson-Roosevelts Asiatic Expedition . . .	1,064
264—Studies of American Plants. Parts I and II	1,051
265—The Land Mammals of Uruguay	1,068
266—Catalogue of Birds of the Americas. Part VI	1,530
267—Honduran Mosses	992
268—Melanesian Shell Money in Field Museum Collections	1,015
269—A Study of the Tooth-billed Red Tanager	1,022
Anthropology, Memoirs—A Sumerian Palace and the "A" Cemetery at Kish, Mesopotamia, Part II	1,472
Anthropology Leaflet 28—The Field Museum-Oxford University Expedition to Kish, Mesopotamia, 1923-1929	2,993
Geology Leaflet 10—Diamonds	6,023
Geology Leaflet 11—Neanderthal (Mousterian) Man	6,056
Geology Leaflet 12—Cement	3,036
Zoology Leaflet 10—The Truth about Snake Stories	3,045
Zoology Leaflet 11—Frogs and Toads of the Chicago Area	3,002
Field Museum and the Child	4,070
General Guide	8,530
Field Museum News (January, 1930, issue)	6,800
Total	69,630

The number of labels and other impressions was as follows:

	Exhibition labels	Other impressions
Anthropology	8,373	11,665
Botany	1,398	42,943
Geology	13,685	3,000
Zoology	4,163	4,554
Harris Extension	349	2,220
Raymond Division		273,300
General		537,286
Membership information folder		5,527
Direction folder for Rapid Transit Company		49,800
Direction folder for Division of Public Relations		73,872
Publication price list		550
Leaflet price list		800
Miscellaneous post cards		368,910
Miniature sets of exterior and interior views in Museum		2,125
Pictorial post card album		755
Large post card album		115
Total	27,988	1,377,422

DIVISIONS OF PHOTOGRAPHY, ROENTGENOLOGY AND ILLUSTRATION

PHOTOGRAPHY.—The total number of lantern slides, negatives and prints made by the Division of Photography during 1929 was 35,602, an increase of more than 10,000 over that of the previous year. The following tabulation gives a summary of the work performed:

	Lantern slides made	Nega- tives made	Prints made	Enlarge- ments made	Negatives developed for expedi- tions	Trans- parent labels made	Trans- parencies made for exhi- bition
Anthropology.....	523	777	10,045	...	498	...	9
Botany.....	...	362	9,553	130	...	...	...
Geology.....	359	259	1,847	36	134	...	...
Zoology.....	577	249	3,802	45	229	8	...
Harris Extension...	...	35	47	76	88	...	...
Raymond Division .	783	34	581	...	...	...	...
Photogravure.....	...	470	290	...	...	...	...
Publicity.....	...	31	1,618	22	...	...	...
General.....	10	...	852	...	...	...	...
Gift.....	...	...	546	...	...	...	...
Sale.....	16	...	661	...	...	...	...
Total.....	2,268	2,217	29,842	309	949	8	9

ROENTGENOLOGY.—The scope of activities in the Division of Roentgenology has widened during the past year. The X-ray apparatus is being used to a greater extent, and is developing increased significance in the Museum's work.

Research by means of the X-ray in 1929 was carried on in connection with anthropological, geological, and zoological subjects.

An exhaustive study was made of Egyptian animal mummy-packs, resulting in some remarkably interesting revelations. Some of the most elaborately wrapped packages, it was found, contain no skeletons, and some of the carelessly prepared ones hold the finest specimens. One package, wrapped so as to represent a cat, contains, in the head of the bundle, a skull of an unidentified mammal and in the abdominal portion there is a collection of miscellaneous bones, including a cat's skull. One package has an exterior representing a crocodile, but a comparison of roentgenograms of it with recent crocodile skeletons, made by Mr. Karl P. Schmidt, Assistant Curator of Reptiles, indicates that the enclosed specimen may be a lizard.

Roentgenograms aided in the establishment of the identity of a small Egyptian mummy, seven inches long. There was a question as to whether it is human or ape. The X-ray determined definitely that it is a human embryo of three and one-half to four months' development.

Roentgenographic studies were made also of a series of ancient Peruvian babies and children. Very little apparent pathology was found to exist in these specimens.

The extent of ankylosis of the functional fang of a rattlesnake was determined from a roentgenogram, thereby making unnecessary dissection of the reptile's skull.

Radio-active minerals submitted by the Department of Geology were tested for radium content. Experiments were also made of the relative efficacy of ultra-violet and roentgen rays to produce radio-lucence with several different substances.

Paleontological specimens have been found to be surprisingly good subjects for X-ray examination. In most cases there is a marked difference in atomic density between the bony structure and the surrounding matrix, and therefore a satisfactory shadow of the skeleton can be produced.

Special articles on the Museum's roentgenological work appeared during the past year in *Victor News*, *Tiles and Tile Work*, and *Hygeia* magazines.

PHOTOGRAVURE.—Following is a summary of the photogravures produced during the year 1929:

	Number of prints
Leaflet illustrations.....	108,000
Publication illustrations.....	172,000
Memoirs Series, illustrations.....	21,000
Poster headings.....	4,575
Post cards.....	214,000
Total.....	519,575

ARTIST.—The following is a record of the work accomplished during 1929 by this Division:

Large Peruvian frescoes.....	4
Pen and wash drawings.....	132
Maps drawn and lettered.....	25
Plans drawn and lettered.....	22
Lantern slides colored.....	562
Photographs retouched.....	34
Photographs tinted.....	12
Negatives blocked.....	33
Large transparencies colored.....	6
Meteorites colored.....	2
Negatives lettered for copyright.....	8
Street car posters drawn.....	2
Book covers lettered.....	4
Wood engraving repaired.....	1
Miscellaneous items.....	40
Total.....	887

DIVISION OF MEMBERSHIPS

The membership of Field Museum continues to grow encouragingly, evidencing the increased interest which the institution's activities are attracting among public-spirited citizens.

The number of new names added to the Museum's membership during 1929 was 1,363. The names of all Members on the rolls as of December 31, 1929, will be found elsewhere in this Report. Following is a classified list of the total number of memberships:

Benefactors.....	17
Honorary Members.....	22
Patrons.....	34
Corporate Members.....	53
Life Members.....	357
Non-resident Life Members.....	7
Associate Members.....	2,105
Non-resident Associate Members.....	1
Sustaining Members.....	312
Annual Members.....	2,873
Total Memberships.....	5,781

CAFETERIA

During the year 96,505 Museum visitors were furnished refreshments in the cafeteria located on the ground floor, an increase of 10,197 over the number served in 1928. The cafeteria is not operated by the Museum, but is under the management of a concessionaire.

In the pages which follow are submitted the Museum's financial statements, lists of accessions, names of Members, *et cetera*.

STEPHEN C. SIMMS, *Director*.

ATTENDANCE STATISTICS AND DOOR RECEIPTS

FROM JANUARY 1, 1929 TO DECEMBER 31, 1929

Total attendance.....		1,168,430
Paid attendance.....	151,595	
Free admissions on pay days:		
Students.....	16,650	
School children.....	124,935	
Teachers.....	1,396	
Members.....	1,581	
Admissions on free days:		
Thursdays (52).....	139,341	
Saturdays (52).....	251,643	
Sundays (52).....	481,289	
<hr/>		
Highest attendance on any day (May 24, 1929).....	59,843	
Lowest attendance on any day (December 18, 1929).....	81	
Highest paid attendance (September 2, 1929).....	7,268	
Average daily admissions (365 days).....	3,200	
Average paid admissions (209 days).....	725	
Number of guides sold.....	11,653	
Number of articles checked.....	19,987	
Number of picture post cards sold.....	161,226	
Sales of publications, leaflets, handbooks, and photographs	\$4,915.76	

GENERAL AND SPECIAL FUNDS

STATEMENT OF CASH RECEIPTS AND DISBURSEMENTS

AT DECEMBER 31, 1929

Balance, December 31, 1928.....	\$	41,719.84
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RECEIPTS

Income—Endowment, General, Miscellaneous and		
Door Receipts.....	\$	332,510.64
South Park Commissioners.....		222,220.52
Sundry receipts.....		31,537.33
Memberships.....		85,660.00
Contributions.....		301,069.24
Securities sold and matured.....		260,580.17
		<u>1,233,577.90</u>
		\$1,275,297.74

DISBURSEMENTS

Operating expenses.....	\$	613,957.32
Expeditions.....		112,327.56
Collections purchased.....		58,291.59
Furniture, fixtures and equipment.....		74,586.55
Securities purchased.....		298,734.42
Annuities on contingent gifts.....		41,665.00
Bank loans repaid and interest.....		17,756.27
		<u>\$1,217,318.71</u>
Transferred to Sinking Fund.....		10,000.00
		<u>1,227,318.71</u>
Balance, December 31, 1929.....	\$	47,979.03

THE N. W. HARRIS PUBLIC SCHOOL EXTENSION

STATEMENT OF INCOME AND EXPENSES FOR THE YEAR 1929

Interest and dividends on investments.....	\$ 20,687.36
Operating expenses.....	19,888.87
Balance, December 31, 1929.....	<u>\$ 798.49</u>

STANLEY FIELD PLANT REPRODUCTION FUND

STATEMENT OF INCOME AND EXPENSES FOR THE YEAR 1929

Balance, December 31, 1928.....	\$ 650.48
Contributions by Stanley Field during 1929.....	14,527.50
	<u>\$ 15,177.98</u>
Operating expenses—1929.....	15,200.51
Deficit, December 31, 1929.....	<u>\$ 22.53</u>

LIST OF ACCESSIONS

DEPARTMENT OF ANTHROPOLOGY

- ANDRAU, DR. E. W., The Hague, Holland.
4 flint flakes—Muaishir near Rutba Wells, North Arabian Desert, Irak (gift).
- ARMSTRONG, JULIAN, Chicago.
1 felt door decorated with painted appliqué designs of cotton—India (possibly Burma) (gift).
- BODE, MRS. CLARA V., Sheboygan Falls, Wisconsin.
3 ethnological objects: 1 netted scarf (belt), 1 chocolate whisk, and 1 mosquito whisk—Isthmus of Tehuantepec, Veracruz, Mexico (gift).
- BURT, MRS. WILLIAM G., Old Lyme, Connecticut (donor's father, collector).
31 ethnological objects: 1 fabric, 2 wooden masks, 2 pairs of leather sandals, 5 decorated gourds, 1 bow, 2 swords, 3 spears, 3 carved wooden paddles, 1 bottle, 1 fur-covered staff, 1 wooden staff, 1 wooden stool, 1 leather pouch—Sierra Leone, Africa (gift).
- CARPENTER, MRS. JOHN ALDEN, Chicago (Mrs. Z. K. Heidary, collector).
2 marionettes representing a priest and a soldier — Teheran, Persia (gift).
- CUNNINGHAM, ROMEO, Mountainair, New Mexico.
11 objects: 1 skull, 1 hammerstone, and 9 potsherds — Mountainair, New Mexico (gift).
- DEBUC, G., Gauties-les-Bains, Haute Garonne, France.
13 original copies of prehistoric sketches of animals engraved on walls of cave of Montespan—Southwest France (gift).
- DEVINE, HERBERT J., New York.
1 dry lacquer head of a Buddhist statue—Peiping (Peking), China (gift).
- DRUMMOND, DR. I. W., New York.
1 mounted beak of hornbill (Buceros) with frontal carving of scenery and six figures. Seventeenth century—Canton, China (gift).
2 objects: 1 carved hornbill buckle and 1 pudding-stone vase of K'ienlung period (1736-95) — China (gift).
- EULASS, WALTER L., Chicago.
1 flint arrowhead—Calumet Country Club Golf Course, Illinois (gift).
- EVANS, MRS. LYNDEN, Evanston, Illinois.
1 otter skin medicine bag, feet and tail covered with purple flannel decorated with beadwork designs —Potawatomi, northern Wisconsin (gift).
- FIELD MUSEUM OF NATURAL HISTORY.
Collected by Alonzo W. Pond (Central Asiatic Expedition of American Museum of Natural History with Field Museum cooperating):
72 packages of prehistoric stone implements and fragments—Gobi Desert, Inner Mongolia.
Collected by J. Eric Thompson (Second Marshall Field Archaeological Expedition to British Honduras):
352 objects: 182 archaeological specimens, 21 lots of type sherds and 39 ethnological objects from British Honduras; 1 lot of type sherds from Honduras; 54 archaeological objects, 54 ethnological objects, and 1 lot of type sherds from Guatemala — British Honduras, Republic of Honduras, and Guatemala.
Collected by Karl P. Schmidt (Crane Pacific Expedition of Field Museum):
8 ethnological objects: 1 decorated tapa—Fiji; 2 hornbill ornaments, 1 decorated bag with hornbill, 4 feather head ornaments — Sepik River, New Guinea.

Collected by E. S. Riggs (Marshall Field Paleontological Expedition to Argentina and Bolivia):

- 2 stone disks—Barancas (bad lands) of river valley, Tarija, Bolivia.

Collected by Harold J. Coolidge, Jr. (William V. Kelley-Roosevelts Expedition to Eastern Asia for Field Museum):

- 4 articles: 2 women's dresses of White Tai, Tonkin; 2 women's dresses with head-dresses and jewelry, Phunoi and Khakho tribes, Laos—Indo-China.

Collected by W. D. Hambly (Frederick H. Rawson-Field Museum Ethnological Expedition to West Africa):

- 470 objects: wood carvings, decorated gourds, pottery, weapons, implements, musical instruments, ornaments and other ethnographical material — Ovimbundu tribe, Portuguese Angola.

Collected by Field Museum-Oxford University Joint Expedition to Mesopotamia (Marshall Field Fund):

- About 2,000 objects: pottery, alabaster and other stone vessels, flint and copper implements, cylinder seals, beads, necklaces, etc.—Kish, Mesopotamia.

Purchases:

- 62 objects: 49 painted pebbles, 2 casts, 11 skeletons of French paleolithic period—Mas d'Azil, France, from Professor Henri Breuil.
- 1 necklace of grizzly-bear claws—Winnebago, northern Wisconsin, from Oliver LaMere, collector.
- 1 chief's coat of ermine—Haida, Tadgilanas division, Kasaan, Prince of Wales Island, Alaska, from Paul Warner.
- 1 colored cast of tooth of *Sinanthropus pekinensis*—China, from R. F. Damon and Company, London.
- 1 medicine otter, with medicine and appliqué work—Potawatomi, Phlox, Wisconsin, from Julius and August Rosenwald Fund (Paul Warner, collector).
- 120 prehistoric implements of stone and antler, and sherds of pottery

—Neuchatel (Swiss lake dwellings), Switzerland, from Dr. P. Vouga, collector.

- 172 archaeological objects: 20 complete pottery vessels, 4 half complete pottery vessels, 78 figurines, 4 stone and 5 obsidian objects, 10 jade beads, 1 jade and shell necklace, 5 shell objects, 41 type potsherds, 3 pieces of marble vessels — Republic of Honduras, from Dr. Wilson Popenoe, collector.

- 31 objects: pottery, pipe-bowl, arrow and spear points, ornaments and ceremonial implements excavated in Scott, Greene, Schuyler, Sangamon, and Calhoun Counties, Illinois, from Julius and Augusta Rosenwald Fund (J. Merrill, collector).

FUCHS, MRS. F., Johannesburg, Transvaal, South Africa (Arthur Fuchs, collector).

- 3 pairs and one single copper bracelet—Maxosa, South Africa (gift).

HANSEN, ERICH, Chicago.

- 9 objects: model of kayak; model of wooden water-bucket, with dipper; model of drying rack; lamp pot, stand, 3 bone wound plugs, small skin pouch—Angmagsalik Eskimo, Ditridas, East Greenland (gift).

KENNEDY, KEITH, Sydney, Australia.

- 47 aboriginal stone implements—Kitchen middens near Sydney, Australia (exchange).

KENYON, A. S., Melbourne, Australia.

- 38 stone and wooden implements—Australia (exchange).

KERCHEER, DR. JOHN, Chicago.

- 8 objects: models of kayak and sledge, 2 traps, iron adze, 2 pairs of children's boots, and wooden mask—Eskimo, Golovnin Bay District, Alaska (gift).

LAUGHLIN, R. M., Havana, Illinois.

- 1 fragmentary lower mandible, with teeth, from Indian burial—Fulton, Illinois (gift).

MACKAY, MRS. ERNEST, Dokri, Sindh, British India.

- 1 coup-de-poing of Acheulean type—Karyatein, Syria (gift).

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MELDRUM, DR. A. M., Spokane, Washington.

2 skulls of aborigines — Australia (gift).

MÖLLER, J. A., New York (A. W. Bahr, collector).

1 archaic white jade spike, carved with human figure, Chou period — China (gift).

MOON, H. F., Bagdad, Irak.

23 mosaic fragments from the tessellated pavement of a Roman fort at Samra on the Hejaz Railway — Samra, Transjordan (gift).

NELSON, MURRY, Chicago (donor's father, collector).

1 red flannel coat, with green and blue edgings, decorated with beadwork — East Woodland tribe of Chicago area (gift).

QUARRIE, S. W., Royston, Herts, England.

13 flint flakes from east end of Wadi Meir — North Arabian Desert, Irak (gift).

REES, GROUP CAPTAIN, V. C., London, England.

32 objects: 2 arrowheads and 30 flint flakes — near Qase Hallabat, North Arabian Desert, Transjordan (gift).

REYNOLDS, EARLE H., Chicago (Herbert J. Devine, collector).

2 painted mortuary clay figures of horsewomen playing polo — China (gift).

ST. PÉRIER, COUNT DE, Morigny par Etampes, Seine-et-Oise, France.

1 cast of female figure (so-called Venus) of the Lespuge-Aurignacian period — Southwest France (gift).

SARGENT, HOMER E., Pasadena, California.

46 baskets — Pomo, Mono, Kern, Paiute, Yokut, Louiseño, Panamint, and Washo, California (gift).

SCHMERSE, PAUL, Edison Park, Illinois.

1 flint arrowhead — Desplaines Golf Road, Illinois (gift).

SCHMIDT, KARL P., Chicago.

10 objects: 1 carved coconut bottle, lime gourd and stick, 3 spinning

tops, 1 tobacco-pipe, 2 puberty covers, 2 spears — Upper Sepik River, New Guinea (gift).

SETON-KARR, H. W., London, England.

58 paleolithic and neolithic knives, scrapers, arrowheads and other implements — England, Belgium, Egypt, India, and Ceylon (gift).

SHELDON, THEODORE, Chicago.

1 kris with carved wooden handle and metal sheath — Java (gift).

SPRAGUE, COLONEL A. A., Chicago.

1 black and gold lacquered saddle dated 1868 — Japan (gift).

TROMBE, FELIX, Gauties-les-Bains, Haute Garonne, France.

1 plaster impression of a prehistoric footmark from cave of Montespán, and plan of cave drawn to scale — Southwest France (gift).

UNIVERSITY MUSEUM (Department of Human Anatomy), Oxford, England.

4 casts of frontal and left parietal bones, temporal, maxilla and mandible of Mousterian child's skull — Gibraltar, Spain (exchange).

VONDRASEK, FRANK, Cicero, Illinois.

23 quartz arrowheads and spear points — Magnet Cove, Arkansas (gift).

WHITE, MRS. ALEXANDER, Chicago.

2 wooden panels lacquered red and gold, carved with undercut reliefs — China (gift).

WICKER, MISS CAROLYN, Chicago.

18 objects: 8 mandarin cap-buttons, fish emblem, bone emblems of authority, fan, lacquered cover, 4 baskets, 2 strings of beads, hide sandals, pottery wine-jar; also picture post cards — China, Japan, Annam, Philippines, Burma, Ceylon, Greece, Italy, and Mexico (gift).

YAMAGATA, MR. AND MRS. S., Chicago.

1 ceremonial battledore used as a New Year's gift — Japan.

DEPARTMENT OF BOTANY

**ALL-AMERICAN MOHAWK
RADIO CORPORATION,**
Chicago.

1 specimen of veneer of Australian
silk-oak (gift); 2 wood specimens
(gift).

**AMERICAN WALNUT MANUFAC-
TURERS' ASSOCIATION,**
Chicago.

1 wheel section of black walnut
(gift).

ARNOLD ARBORETUM, Jamaica
Plain, Massachusetts.

785 specimens of plants (exchange).

ARSÉNE, REV. BROTHER G., Las
Vegas, New Mexico.

1 plant specimen (gift).

BAILEY, DR. L. H., Ithaca, New
York.

1 specimen of plant from Cuba
(gift).

BALL, DR. C. R., Washington, D.C.
12 specimens of willows (gift).**BANGHAM, WALTER N.,** Forest
Hills, Massachusetts.

1 specimen of plant from the Canal
Zone (gift).

BARTRAM, EDWIN B., Bushkill,
Pennsylvania.

75 specimens of mosses from Arizona
(gift).

BAUER AND BLACK, Chicago.

1 airplane first aid case (gift).

BEATTY, LESTER A., Gary, Indiana.
1 specimen of cinchona bark (gift).**BENKE, H. C.,** Chicago.

517 specimens of plants (gift); 38
wood specimens (gift); 140 pack-
ets of seeds (gift).

**BOTANICAL MUSEUM OF HAR-
VARD UNIVERSITY,** Cam-
bridge, Massachusetts.

1 plant specimen (gift).

**BOTANICAL GARDEN AND MU-
SEUM,** Berlin-Dahlem, Ger-
many.

50 specimens of plants from Peru
(exchange).

BOTANISKA INSTITUTIONEN,
Upsala, Sweden.

450 specimens of plants from Brazil
(exchange).

BREMER, MISS MARY, Crown
Point, Indiana.

18 specimens of plants from Indiana
(gift); 18 packets of seeds (gift).

BREMER, MISS SOPHIA, Crown
Point, Indiana.

2 specimens of mosses from Indiana
(gift).

**BRITISH MUSEUM (NATURAL
HISTORY),** London, England.

1,034 specimens of plants from South
America (exchange).

BRYAN, PROFESSOR G. S., Madi-
son, Wisconsin.

3 palm fruits from Africa (gift).

BUCHER, G. C., Santiago de Cuba,
Cuba.

1 specimen of a Cuban plant (gift).

BUSH, B. F., Courtney, Missouri.

9 specimens of plants from Missouri
(gift).

BUTLER, ALFRED F., Tela, Hon-
duras.

3 specimens of plants from Hon-
duras (gift).

CALDERÓN, DR. SALVADOR, San
Salvador, Salvador.

238 specimens of plants from Salva-
dor (gift).

**CALIFORNIA ACADEMY OF
SCIENCES,** San Francisco, Cali-
fornia.

2 specimens of plants (exchange).

CARTER, J. D., Deerfield, Illinois.

1 specimen of Aesculus fruits (gift).

CELOTEX COMPANY, Chicago.

27 photographs (gift); 10 specimens
of celotex (gift).

CHAMBERLAIN, DR. C. J., Chicago.

2 specimens of cycads (gift).

CHAPMAN, DR. F. M., New York.

1 specimen of plant from the Canal
Zone (gift).

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CHATEAU, REV. FATHER I., Mission, Texas.

37 specimens of plants from Texas (gift).

CHICAGO INTERNATIONAL LIVE STOCK EXPOSITION.

4 specimens of Australian wheat (gift).

CLARKSON, MRS. RALPH, Chicago.

2 specimens of plants (gift); 1 specimen of seeds of *Zamia* (gift).

CLEMENS, MRS. JOSEPH, Manila, Philippine Islands.

3 specimens of plants (gift).

COMMERCIAL SOLVENTS CORPORATION, Terre Haute, Indiana. 1 wall chart (gift).

COOK, G. M., Chicago.

1 specimen of plant from Texas (gift).

COOPER, PROFESSOR W. S., Minneapolis, Minnesota.

349 specimens of plants from Alaska and British Columbia (gift).

CROSBY, MISS GRACE, Providence, Rhode Island.

1 specimen of plant from Connecticut (gift).

DEAM, C. C., Bluffton, Indiana.

1 packet of seeds (gift).

DEGENER, PROFESSOR OTTO, Honolulu, Hawaii.

5 specimens of Hawaiian plants (gift).

DIRECCIÓN DE ESTUDIOS BIOLÓGICOS, Chapultepec, Mexico.

1 specimen of *Ochroma* fiber (gift).

DIRECCIÓN GENERAL DE AGRICULTURA, Guatemala City, Guatemala.

189 specimens of Guatemalan plants (gift).

DOOLITTLE, MRS. HAROLD M., Onokama, Michigan.

1 specimen of plant from Michigan (gift).

DOUBLEDAY, ARNOLD, Chicago.

12 specimens of mosses from Illinois (gift).

EIFRIG, G., River Forest, Illinois.

56 specimens of plants from the United States (gift).

ENLOW, C. R., Gainesville, Florida.

2 specimens of plants from Florida (gift).

EWALD, GEORGE, Chicago.

1 specimen of guayule rubber (gift).

FARLOW HERBARIUM OF HARVARD UNIVERSITY, Cambridge, Massachusetts.

141 specimens of cryptogamic plants (exchange).

FIELD MUSEUM OF NATURAL HISTORY.

Collected by B. E. Dahlgren and Emil Sella (Marshall Field Botanical Expedition to the Amazon):

2,500 herbarium specimens from Brazil.

Collected by Henry Field (Field Museum-Oxford University Joint Expedition to Mesopotamia):

3 specimens of barley from Kish;
1 specimen of charred grain from Jemdet Nasr.

Collected by Herbert Stevens (William V. Kelley-Roosevelts Expedition to Eastern Asia for Field Museum):

2,403 specimens of plants from China.

Collected by J. Eric Thompson (Second Marshall Field Archaeological Expedition to British Honduras):

5 specimens of plants from British Honduras.

Collected by F. Kingdon Ward (William V. Kelley-Roosevelts Expedition to Eastern Asia for Field Museum):

400 specimens of plants from Burma and Indo-China.

Collected by August Weberbauer (Marshall Field Expedition to Peru, 1929):

888 herbarium specimens from Peru.

Collected by Llewelyn Williams (Marshall Field Botanical Expedition to the Amazon):

9,500 herbarium specimens from Peru;
1,088 wood specimens from Peru.

Rockefeller Foundation Fund for Photographing Type Specimens:

- 819 negatives of type specimens in the herbarium of the Museu Goeldi; 13 photographic prints of type specimens in the Berlin Herbarium.
- Transferred from the Division of Photography:
5,599 photographic prints.
- Purchases:
- 300 specimens of plants, 4 wood specimens, collected in Trinidad by W. E. Broadway.
- 342 specimens of plants collected in Ecuador by Brother Gemel-Firmín.
- 623 specimens of Mexican plants collected by M. E. Jones.
- 962 specimens of British Honduras plants collected by C. L. Lundell.
- 320 specimens of Venezuelan plants collected by Henry Pittier.
- 1,079 specimens of plants collected in Bolivia by José Steinbach.
- 500 specimens of Argentine plants collected by S. Venturi.
- 331 specimens of Argentine plants collected by W. Lossen.
- 100 specimens of plants collected in Chile by Professor Montero.
- 100 specimens of cryptogamic plants from Europe.
- 53 photographs of Mexican plants; 6 canna roots; 6 specimens of chile peppers; 1 specimen of bay leaves; 1 specimen of garlic; 1 specimen of horse-radish.
- FLAUTT, J. L., Chicago.
2 specimens of plants from Georgia (gift).
- FRIESSER, JULIUS, Chicago.
1 specimen of an Illinois plant (gift).
- FRITZ, PROFESSOR EMANUEL, Berkeley, California.
6 sugar pine cones (gift).
- FROST, S. W., Arendtsville, Pennsylvania.
251 specimens of plants from the Canal Zone (gift).
- GARFIELD PARK CONSERVATORY, Chicago.
3 specimens of cycads (gift).
- GARRETT, PROFESSOR A. O., Salt Lake City, Utah.
700 specimens of plants, chiefly from Utah (gift).
- GILBERT, A. H., Coral Gables, Florida.
5 plants of *Zamia* (gift).
- GLYNN, JOHN E., Chicago.
1 specimen of gourd (gift).
- GRANT, CLEVELAND P., Chicago.
1 specimen of an Illinois oak (gift).
- GRAY HERBARIUM OF HARVARD UNIVERSITY, Cambridge, Massachusetts.
92 specimens of plants from tropical America (exchange).
- GRISCOM, LUDLOW, Cambridge, Massachusetts.
119 specimens of plants (exchange).
- GRONEMANN, CARL E., Elgin, Illinois.
6 specimens of Illinois plants (gift).
- HAPEMAN, DR. HARRY, Minden, Nebraska.
2 specimens of plants from Nebraska (gift).
- HAUGHT, OSCAR L., Negritos, Peru.
259 specimens of plants from Peru (gift).
- HAYNIE, NELLIE V., Oak Park, Illinois.
13 specimens of Illinois and Colorado plants (gift).
- HELLMAYR, DR. C. E., Chicago.
14 specimens of European orchids (gift).
- HERRERA, PROFESSOR FORTUNATO L., Cuzco, Peru.
551 specimens of Peruvian plants (gift).
- HOLMAN, JOHN P., Phoenix, Arizona.
2 specimens of plants from Arizona (gift).
- INSTITUTO BIOLÓGICO DE DEFESA AGRÍCOLA E ANIMAL, Rio de Janeiro, Brazil.
20 specimens of plants from Brazil (gift).

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- JANSSON, K. P., Groton, Connecticut.
2 specimens of plants from Connecticut (gift).
- JARDIN BOTANIQUE DE L'ETAT, Brussels, Belgium.
200 specimens of plants from tropical America (exchange).
- JARDIN BOTANIQUE PRINCIPAL, Leningrad, U.S.S.R.
130 specimens of plants from Mexico and northern South America (exchange).
- JOHANSEN, DR. HOLGER, La Lima, Honduras.
52 specimens of plants from Honduras (gift).
- KANEHIRA, PROFESSOR R., Fuka, Japan.
206 specimens of Peruvian plants (gift).
- KAUFFMANN, EMILIO, Belem, Brazil.
81 specimens of plants from Brazil (gift).
- KENDALL, MRS. B. A., Elburn, Illinois.
1 specimen of an Illinois plant (gift).
- KENOYER, PROFESSOR L. A., Kalamazoo, Michigan.
150 specimens of plants from Michigan (gift).
- KOEPKE, ANTON, Chicago.
1 pine cone from California (gift).
- LANCETILLA EXPERIMENT STATION, Tela, Honduras.
101 specimens of Honduras plants (gift); 12 photographs of plants (gift).
- LANKESTER, C. H., Cartago, Costa Rica.
17 specimens of plants (gift).
- LUNDELL, C. L., New York.
210 specimens of plants from British Honduras (gift).
- MACBRIDE, J. FRANCIS, Chicago.
10 specimens of plants from Idaho and Indiana (gift); 1 large sagebrush bush for exhibition purposes (gift).
- MACKAY, E. K., San Francisco, California.
1 specimen of *Jacquinia* from Ecuador (gift).
- MANLEY, JOHN A., New Brunswick, New Jersey.
1 horseshoe imbedded in apple wood (gift).
- MARIE-VICTORIN, PROFESSOR, Montreal, Canada.
46 specimens of Canadian plants (exchange).
- MARTIN, MISS ELLA M., Greensboro, North Carolina.
59 specimens of plants from North Carolina (gift).
- MARTINEZ, PROFESSOR MAXIMINO, Mexico City, Mexico.
15 specimens of Mexican plants (gift).
- MATHIAS, MISS MILDRED E., St. Louis, Missouri.
4 specimens of mosses from Indiana (gift).
- MERRILL, DR. ELMER D., Berkeley, California.
2 specimens of plants from the Philippine Islands (gift).
- MEXIA, MRS. YNES, Berkeley, California.
8 specimens of Mexican plants (gift).
- MINTON, T. W., AND COMPANY, Barboursville, Kentucky.
2 samples of hickory wheel spokes (gift).
- MOSELEY, E. L., Bowling Green, Ohio.
196 specimens of plants from Ohio (gift).
- MOXLEY, GEORGE L., Los Angeles, California.
1 specimen of a cultivated plant (gift).
- NATURHISTORISCHES MUSEUM, BOTANISCHES ABTEILUNG, Vienna, Austria.
671 specimens of European plants (exchange).

NATURHISTORISKA RIKSMUSEET, BOTANISKA AFDELNING, Stockholm, Sweden.

257 specimens of plants, chiefly from Cuba (exchange).

NEVERMANN, FERDINAND, San José, Costa Rica.

10 specimens of fungi from Costa Rica (gift).

NEW YORK BOTANICAL GARDEN, New York.

94 specimens of plants, chiefly from tropical America (exchange).

NICHOLS, HENRY W., Chicago.

1 packet of seeds (gift).

OBERLIN COLLEGE, DEPARTMENT OF BOTANY, Oberlin, Ohio.

480 specimens of plants, chiefly from California (gift).

PANHANDLE LUMBER COMPANY, Spirit Lake, Idaho.

1 pine board for exhibition purposes (gift).

PARKS, H. B., San Antonio, Texas.

1 specimen of plant from Texas (gift).

PAY, CAPTAIN ARTHUR, Paramaribo, Surinam.

5 specimens of *Sickingia* wood (gift).

PICKREL WALNUT COMPANY, St. Louis, Missouri.

3 walnut boards for exhibition purposes (gift).

PITTIER, PROFESSOR H., Caracas, Venezuela.

2 specimens of plants from Venezuela (gift).

PLATANIA, PROFESSOR GAETANO, Catania, Italy.

6 specimens of seaweeds (gift).

POMONA COLLEGE, DEPARTMENT OF BOTANY, Claremont, California.

915 specimens of plants of the United States and Mexico (exchange).

PURPUS, DR. C. A., Zacuapam, Mexico.

443 specimens of Mexican plants (gift).

RAWSON, DR. VANCE, Chicago.

1 specimen of seeds of *Pyrularia* from Kentucky (gift).

RICHTER, CONRAD, Albuquerque, New Mexico.

3 specimens of plants from New Mexico (gift).

RIDGWAY, ROBERT, Olney, Illinois.

1 specimen of an Illinois plant (gift).

RIDGWAY, ROBERT, ESTATE OF.

4,000 specimens, comprising the Robert Ridgway Herbarium of Illinois plants (bequest).

ROYAL BOTANIC GARDENS, Kew, England.

676 specimens of plants from tropical America (exchange).

ROYAL BOTANIC GARDENS, Edinburgh, Scotland.

401 specimens of plants from Paraguay (exchange).

ST. CLAIR EXPERIMENT STATION, Port-of-Spain, Trinidad.

1 plant specimen (gift).

SALGUES MUSEUM, Brignoles, France.

2 specimens of plants (gift); 1 packet of seeds (gift).

SCHIPP, WILLIAM A., Belize, British Honduras.

466 specimens of plants (gift).

SCHRAMM, REV. E. E., Cabo Gracias a Dios, Nicaragua.

56 specimens of plants from Nicaragua (gift).

SHERFF, Dr. E. E., Chicago.

33 specimens of plants (gift).

SMITH, F. W., Guasave, Mexico.

14 specimens of Mexican plants (gift).

STANDLEY, MRS. FLORENCE A., Fort Myers, Florida.

9 specimens of plants from Florida (gift); 4 packets of seeds (gift).

STANDLEY, PAUL C., Chicago.

471 specimens of plants of Illinois and Indiana (gift); 289 packets of seeds (gift).

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STANDLEY, PAUL C., and DOUBLEDAY, ARNOLD, Chicago.

420 specimens of plants, chiefly mosses, of Illinois and Indiana (gift).

STANDLEY, PAUL C., and MACBRIDE, J. FRANCIS, Chicago.

105 specimens of plants from Indiana (gift).

STEVENSON, NEIL, Belize, British Honduras.

5 specimens of palms from British Honduras (gift).

STOKES, PROFESSOR W. E., Gainesville, Florida.

1 specimen of plant from Florida (gift).

STORK, PROFESSOR H. E., Northfield, Minnesota.

668 specimens of plants from Costa Rica (gift).

SUGAR PINE PRODUCERS OF CALIFORNIA (through Professor Emanuel Fritz), Berkeley, California.

5 planks of sugar pine lumber (gift); collection of sugar pine cones (gift).

TAPL, A., Elmhurst, Illinois.

1 wood specimen (gift).

TAYLOR, MRS. H. E., Kankakee, Illinois.

1 specimen of an Illinois plant (gift).

THOMPSON, J. W., Seattle, Washington.

12 specimens of plants from Oregon (gift).

THURING, WILLIAM, Chicago.

4 ears of corn (gift).

TURNER, DAY AND WOOLWORTH HANDLE COMPANY, INC., Louisville, Kentucky.

4 specimens of ax and hammer handles (gift); samples of hickory nuts (gift).

UNITED FRUIT COMPANY, Boston, Massachusetts.

1 trunk of a cow-tree (*Couma guatemalensis*) from Guatemala (gift).

UNITED STATES DEPARTMENT OF AGRICULTURE, OFFICE OF FOREIGN PLANT INTRODUCTION, Washington, D.C.

1 specimen of plant from Colombia (gift).

UNITED STATES DEPARTMENT OF AGRICULTURE, OFFICE OF SYSTEMATIC AGROSTOLOGY, Washington, D.C.

312 specimens of grasses (exchange).

UNITED STATES NATIONAL MUSEUM, Washington, D.C.

1,001 specimens of plants (exchange); 144 hand specimens of woods (exchange).

UNIVERSITY OF MICHIGAN HERBARIUM, Ann Arbor, Michigan.

9 specimens of plants from the Canal Zone (gift).

UNIVERSITY OF TEXAS, DEPARTMENT OF BOTANY, Austin, Texas.

11 specimens of plants (gift).

UPHOF, DR. J. C. T., Winter Park, Florida.

4 specimens of Florida plants (gift).

VAUGHAN'S SEED STORE, Chicago.

8 samples of leguminous seeds (gift).

VINCENT, MISS EDITH M., Chicago.

8 specimens of mosses of Illinois and Indiana (gift).

WALKER, E. T., Chicago.

1 specimen of *Mucuna* seeds (gift).

WALTHER, ERIC, San Francisco, California.

1 specimen of a cycad (gift).

WESTCOTT, CHARLES, River Forest, Illinois.

1 specimen of wood of *Casuarina* (gift); 1 herbarium specimen (gift).

WESTFALL, REV. FRED G., Gresham, Wisconsin.

1 specimen of plant from Wisconsin (gift).

- WETMORE, R. H., Cambridge, Massachusetts.
77 specimens of plants from the Canal Zone (gift).
- WILLIAMS, F. B., CYPRESS COMPANY, LTD., Patterson, Louisiana.
4 cypress boards for exhibition purposes (gift).
- WILLIAMS, ICHABOD T., AND SONS, New York.
3 panels of Cuban, Peruvian, and Mexican mahogany (gift).
- WILLIAMS, R. O., Port-of-Spain, Trinidad.
3 seed pods of mahogany (gift).
- WITTE MEMORIAL MUSEUM, San Antonio, Texas.
392 specimens of plants, chiefly from Texas (gift).
- WITTROCK, G. L., Chicago.
121 specimens of mosses of Illinois (gift).
- WOLCOTT, A. B., Downers Grove, Illinois.
1 specimen of an Illinois plant (gift).
- YALE UNIVERSITY, SCHOOL OF FORESTRY, New Haven, Connecticut.
183 herbarium specimens, chiefly from tropical America (gift); 1 pod of milkweed from British Honduras (gift); 1 black willow board (gift); 17 specimens of crude gums (gift); 1 fruit of African mahogany (gift); 1 abnormal wood growth (gift).
- ZETEK, JAMES, Ancon, Canal Zone.
1 specimen of plant from the Canal Zone (gift).

DEPARTMENT OF GEOLOGY

- ACKERMAN, CHARLES N., Chicago.
1 specimen fossil wood—Antioch, Illinois (gift); 1 specimen shell marl—Grass Lake, Illinois (gift); 1 specimen wood cut by fossil beaver—Grass Lake, Illinois (gift).
- ADAMSON, GEORGE H., Chicago.
6 specimens serpentine—Havana, Cuba (gift).
- BAHR, A. W., New York.
1 specimen fossil teleost fish—China (gift).
- BEDFORD, GEORGE, Morris, Illinois.
Parts of skeletons of two individuals of mastodon, tusk and lower jaws of mammoth, skull and antlers of *Cervalces*, bones of bison—Minooka, Illinois (gift).
- BILHARZ, O. M., St. Louis, Missouri (deceased).
4 teeth and 2 tusks of young mastodon—Flat River, Missouri (gift).
- BLOCHER, ARTHUR, Amboy, Illinois.
87 specimens invertebrate fossils—Inlet, Lee County, Illinois (exchange).
- BOWER, WILLIAM, TOODIE and FRANKLIN, Argos, Indiana.
Partial skeleton of *Mastodon americanus*—Argos, Indiana (gift).
- BREECE, RAYMOND, St. Louis, Missouri.
1 polished moss agate—near Miles Canyon, Montana (gift).
- BRYANT, E. R., Osceola, Missouri.
1 specimen weathered encrinal limestone—Osceola, Missouri (gift).
- BUHLIS, RICHARD, Little Rock, Arkansas.
1 specimen gold in mariposite—Mariposa, California (gift).
- CHALMERS, WILLIAM J., Chicago.
1 specimen collinsite—British Columbia (gift); 8 specimens crystallized minerals—Madagascar (gift); 26 specimens crystallized minerals—various localities (gift).
- CHERONIS, NICHOLAS, Chicago.
7 specimens fluorescent and phosphorescent compounds (gift).

CHICAGO, MILWAUKEE, ST. PAUL
AND PACIFIC RAILWAY,
Chicago.

- 1 specimen sand concretion—
Mobridge, South Dakota (gift).

CHRISTENSON, ARTHUR, Des-
plaines, Illinois.

- 1 specimen eroded limestone—Des-
plaines, Illinois (gift).

COLORADO MUSEUM OF NATU-
RAL HISTORY, Denver, Colo-
rado.

Prepared fossil skeleton of *Trigonias
hypostylus* (exchange).

CRANE, RICHARD T., JR., Chicago.

- 1 cabochon ruby—Ceylon (gift); 1
chrysoberyl cat's-eye—Ceylon
(gift); 1 cut aquamarine—Minas
Geraes, Brazil (gift).

DOORENBOS, GARRETT G., Kala-
mazoo, Michigan.

- 1 specimen oil sand—Jefferson
County, Colorado (gift); 1 speci-
men sand-lime concretion—
Adams County, Colorado (gift).

DVORAK, JOSEPH, JR., Downers
Grove, Illinois.

- 1 specimen fossil sponge—Downers
Grove, Illinois (gift).

EASTER, DR. MABEL B., Portland,
Oregon.

- 1 upper molar of *Elephas Columbi*—
Port Townsend, Washington (gift).

FEINBERG, A., Chicago.

- 1 specimen cave deposit—Chicago
(gift).

FIELD MUSEUM OF NATURAL
HISTORY.

Collected by O. C. Farrington:

- 1 specimen feldspar—West Paris,
Maine.
1 specimen diabase—Medford, Mas-
sachusetts.

Collected by the Crane Pacific Expedi-
tion of Field Museum:

- 3 specimens rock—Suva, Fiji
Islands.

Collected by the Marshall Field North
Arabian Desert Expedition:

- 11 specimens desert sands—North
Arabian Desert.
1 specimen loess—North Arabian
Desert.

Collected by the Marshall Field Expe-
dition to Newfoundland:

- 24 specimens of minerals and ores—
Newfoundland.

Collected by the Marshall Field Expe-
dition to New Mexico:

- 173 specimens volcanic products—San
Mateo and Zuni Mountains, New
Mexico.

Prepared in Museum laboratory:

Model of an oil well—Lawrence-
ville, Illinois.

Purchases:

- 8 specimens fossil echinoids—Levy
County, Florida.

- 2 specimens sand concretions—Im-
perial Valley, California.

- 2 specimens illustrating wind ero-
sion—Indio, California.

- 1 specimen tourmaline—California.

- 1 specimen lodestone — Wasatch
Mountains, Utah.

- 1 cut black opal—Australia.

- 2 specimens fossil crinoids—Bund-
enbach, Germany.

- 35 specimens synthetic gems.

- 1 specimen garnet (cut).

- 1 specimen blue zircon (cut).

Portion of stone meteorite with crust
—Troup, Texas.

- 14 specimens altered meteorites—
Brenham, Kansas.

Etched section of Weekeroo meteor-
ite—Weekeroo, South Australia.

- 2 skulls and jaws of *Protoreodon* sp.
—Ouray, Utah.

Skull and jaws and other bones of
Achaenodon robustus — Uintah
Basin, Utah.

Partial skeleton of *Hyrachyus*—
Utah.

Relief map of Glacier Park.

FREDERICK, F. G., Chicago.

- 1 human skull—Montana (gift); 1
specimen *Baculites* — Montana
(gift); 1 specimen limonite and
quartz—Brazil (gift); 1 specimen
flint nodule—Montana (gift).

FRISZ, J. W., Waveland, Indiana.

- 1 specimen calcareous tufa with
sphagnum — Waveland, Indiana
(gift).

- GARDEN, FRANK M., Lake Forest, Illinois.
1 specimen Lorraine quartzite—Searchmont, Canada (gift).
- GEBAUER, HENRY, Chicago.
7 specimens minerals—various localities (gift); 4 specimens clay stones—Middletown, Connecticut (gift); 1 specimen fossil fish—Lebanon, Syria (gift); 381 specimens invertebrate fossils and fossil plants—various localities (gift).
- GRAMS, WILLIAM F. C., Desplaines, Illinois.
4 specimens fossil coral and 3 photographs—Cato, Wisconsin (gift).
- HALVORSEN, E. E., Coalinga, California.
73 specimens invertebrate fossils—San Benito County, California (gift).
- HARBICHT, DARWIN, Ingomar, Montana.
1 jaw of fossil fish, 1 vertebra of fossil fish, 1 specimen fossil gastropod—Grand View, Idaho (gift).
- HUBBARD, F. N., Homewood, Illinois.
2 specimens hematite geodes—near Murfreesboro, Arkansas (gift).
- ILLINOIS STATE MUSEUM, Springfield, Illinois.
1 cast of the 9-pound individual of the Tilden meteorite—Tilden, Illinois (gift).
- JENNINGS, A. A., Chicago.
1 specimen dendrites—Bisbee, Arizona (gift).
- JOHNSTON, W. J., Ingomar, Montana.
2 specimens fossil Baculites—Ingomar, Montana (gift).
- KEESTER, LIEUTENANT-COMMANDER W. J., Curtis Bay, Maryland.
5 specimens volcanic dust—Katmai volcano, Alaska (gift).
- KEESTER, J. H., Cicero, Illinois.
1 specimen quartz crystals in quartz, 62 specimens quartz crystals, 2 specimens quartz crystals in matrix—McCurtain County, Oklahoma (gift).
- KOELNAU, LUDWIG A. VON GLAENTZKE, Chicago.
17 specimens agate and concretions—Wisconsin and Chicago (gift).
- KRANZ, LEROY, Harvey, Illinois.
7 specimens fossil plants—Mazon Creek, Illinois (gift).
- LAHDE, CLARENCE, Harvey, Illinois.
7 specimens fossil plants—Mazon Creek, Illinois (gift).
- LETL, FRANK H., Chicago.
33 specimens invertebrate fossils—Amboy, Illinois (gift); 5 specimens fossil plants—Mazon Creek, Illinois (gift); 3 specimens fossil plants—near Coal City, Illinois (gift).
- LOVE, CHARLES A., Aurora, Illinois.
3 teeth of fossil shark, 3 teeth of modern shark (gift).
- LUKENS, W. D., British Columbia.
1 specimen collinsite—British Columbia (gift).
- MACDAIRMID, MRS. FLORENCE, Isle of Wight, England.
4 specimens invertebrate fossils—Isle of Wight, England (gift).
- MILLAR, JOHN R., Chicago.
15 specimens fossil plants—Moore Mine, Terre Haute, Indiana (gift).
- MORRIS, MRS. H. C., Chicago.
1 specimen crude petroleum—Reagan County, Texas (gift).
- NICHOLSON, VICTOR, Chicago.
1 specimen glauconite—New Jersey (gift).
- NIEH, PAUL S., Chicago.
1 specimen sphalerite in a concretion, 1 specimen double concretion, 8 specimens fossil plants—Mazon Creek, Illinois (gift).
- PATTERSON, BRYAN, Chicago.
6 specimens invertebrate fossils—various localities (gift); 8 specimens fossil plants—Mazon Creek, Illinois (gift).
- PATTERSON, COLONEL J. H., Cairo, Egypt.
9 specimens invertebrate fossils—Ghizeh, Egypt (gift).

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PCH, MRS. MARY, Chicago.

2 specimens fossil coral—Indiana (gift).

PETERSMEYER, E. C., Oklahoma.

1 specimen hematite concretion—Breckenridge, Texas (gift).

PETERSON, WILLIAM A., Chicago.

Tusk of fossil mammoth—Yukon River, Alaska (gift).

PFEIFER, MRS. H., Des Moines, Iowa.

1 specimen azurite, 1 specimen quartz colored by copper compound—Arizona (gift).

PITTS, WILLIAM B., Sunnyvale, California.

5 specimens jasper, chalcedony and priceite, 4 polished stones, 1 specimen tooth of fossil horse—Barstow, California (gift).

PLANER, W. F., Hammond, Indiana.

7 specimens orthoclase crystals—Bowie, Colorado (gift).

PRASUHN, JOHN G., Chicago.

25 specimens crinoid geodes, 6 specimens chalcedony geodes, 5 specimens quartz geodes—Morgan County, Indiana (gift).

PURDUE UNIVERSITY, West Lafayette, Indiana.

Portion of stone meteorite with crust—Lafayette, Indiana (gift).

RASSWEILER, AUGUST, Chicago.

1 specimen limonite concretion—Idar, Germany (gift).

RITCHIE BROTHERS, Saratoga Springs, New York.

5 specimens fossil algae—Saratoga Springs, New York (gift).

SCHERNIKOW, ERNEST, San Francisco, California.

16 specimens crystallized minerals—California (gift).

SCOTT, PROFESSOR W. B., Princeton University.

9 drawings of extinct animals from the Santa Cruz formation—Patagonia (gift).

SELLA, EMIL, Chicago.

4 specimens fossil plants—Scranton, Pennsylvania (gift).

SOSNOVEC, V., St. Louis, Missouri.

3 specimens fossil coral, 5 specimens concretions—St. Louis, Missouri (gift).

STANDARD OIL COMPANY (Indiana), Chicago.

1 chart of oil refinery, 105 specimens products of petroleum—Whiting, Indiana (gift).

STEWART, H. D., Galesburg, Illinois.

5 specimens invertebrate fossils—near Galesburg, Illinois (gift).

STOCKON, ALEX, Allegan, Michigan.

1 specimen conglomerate—Allegan, Michigan (gift).

THOMAS, E. T., Wayne, West Virginia.

4 specimens casts of concretions—Tennessee (gift).

TINSLEY, MRS. JAMES H., Chicago.

1 specimen fluorite—Rosiclare, Illinois (gift).

UNIVERSITY OF CHICAGO, Chicago.

Articulated skeleton of *Oreodon gracilis*; articulated skeleton of *Merychys*; articulated skull and jaws of *Poebrotherium*—Nebraska (exchange).

VONDRASEK, FRANK, Cicero, Illinois.

6 specimens minerals—Arkansas (gift).

WALKER, DR. JAMES W., Chicago.

1 specimen of fossil cephalopod—Whitby, England (gift).

WANDT, CARL, Hazelcrest, Illinois.

6 specimens fossil plants—Mazon Creek, Illinois (gift).

WILLIAMS, MRS. S. A., Chicago.

2 sand-lime concretions—El Centro, California (gift).

WINHOLTZ, JERRY E., Chicago.

1 specimen fossil mollusk—Dupage County, Illinois (gift).

WORK, MRS. JOSEPH W., Evanston, Illinois.

45 specimens cut and mounted gems, 4 specimens quartz crystals—various localities (gift).

DEPARTMENT OF ZOOLOGY

AMERICAN MUSEUM OF NATURAL HISTORY, New York.

2 birdskins—Ecuador (exchange).

ASTOR, LORD, London, England.

1 stoat skin and skull—England (gift); 1 wildcat skin and skull—Scotland (gift).

BENNORTH, DONALD, Elgin, Illinois.

7 fishes—Elgin, Illinois (gift).

BERBRICH, M., Chicago.

1 salamander—Algonquin, Illinois (gift).

BIEDERMAN, CHARLES R., Hereford, Arizona.

3 camel crickets—Huachuca Mountains, Arizona (gift).

BOOTH, O. E., Des Moines, Iowa.

1 moth—Des Moines, Iowa (exchange).

BUREAU OF SCIENCE, Philippine Islands.

60 snakes—Philippine Islands (gift).

BURT, CHARLES E., New York.

20 frogs, 8 lizards, 5 snakes—various localities (exchange).

CAMERON, DR. WILL J., Chicago.

2 lizards—Namib Desert, southwest Africa (gift).

CHICAGO ACADEMY OF SCIENCES, Chicago.

1 blue goose—Louisiana (gift).

CLARK, E. W., Detroit, Michigan.

5 Butler's garter snakes (gift).

COCKERELL, PROFESSOR T. D. A., Boulder, Colorado.

1 set scale-insects—Feernza, Central Asia (gift).

CONOVER, H. B., Chicago.

1 pink-footed goose—Cambridge, England (gift); 1 cinnamon teal—Brigham, Utah (gift); 1 ring-necked duck—Swan Lake, Illinois (gift).

CROOK, DR. R. L., Yachow, China.

1 snake, 1 giant salamander—Yachow, China (gift).

DICK, J. H., Chicago.

1 small gecko (gift).

EMERSON, DR. ALFRED E., Chicago.

2 frogs, 8 snakes—Kartabo, British Guiana (gift); 369 named termites—mostly British Guiana (gift).

ERWIN, RICHARD P., Boise, Idaho.

2 scorpions, 2 pseudoscorpions, 1 spider, 5 toad bugs—Idaho (gift).

FALK, MARTIN, Chicago.

1 prairie rattlesnake—Crane, Texas (gift).

FARLEY, R. B., Philadelphia, Pennsylvania.

1 blue goose egg—Gull Lake, Michigan (gift).

FELGER, JESSE L., West Point, Mississippi.

1 horn snake skin—Mississippi (gift).

FELLIPONE, FLORENTINO, Montevideo, Uruguay.

15 birdskins—Montevideo, Uruguay (gift).

FIELD, HENRY, Chicago.

15 mollusks—Plymouth, England (gift).

FIELD MUSEUM OF NATURAL HISTORY.

Collected by George K. Cherrie (James Simpson-Roosevelts Asiatic Expedition):

30 shells—Chinese Turkestan.

Collected by Colonel J. C. Faunthorpe (Marshall Field Expedition to British India):

3 mammal skins, skulls and skeletons—India.

Collected by Ashley Hine (Field Museum Arizona Expedition):

323 birds, 3 mammals—Arizona and British Columbia, Canada.

Collected by Colonel Theodore Roosevelt, Kermit Roosevelt, C. Suydam Cutting, Harold Coolidge, Jr.,

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- Russell Hendee, Josselyn Van Tyne, Ralph Wheeler, Herbert Stevens (William V. Kelley-Roosevelts Expedition to Eastern Asia for Field Museum):
- 1,479 mammal skins and skulls, 4,037 birds, 453 reptiles and batrachians, 438 fishes, 7,833 insects—Yunnan and Szechwan, China; French Indo-China, Siam, Philippine Islands, Borneo.
- Collected by Karl P. Schmidt, A. W. Herre, Walter A. Weber and Frank C. Wonder (Crane Pacific Expedition of Field Museum):
- 881 mammal skins and skulls, 1,200 birds, 2,008 reptiles and batrachians, 686 fishes, 928 insects, 368 crustaceans, 132 mollusks, 100 worms, 25 echinoderms—Haiti, Panama, Pacific Islands, East Indies.
- Collected by J. Eric Thompson (Second Marshall Field Archaeological Expedition to British Honduras):
- 4 mammal skins and skulls, 17 birds—Arenal, British Honduras.
- Collected by Bruce Thorne and George Coe Graves II (Thorne-Graves Arctic Expedition of Field Museum):
- 7 walrus, 5 caribou—Alaska.
- Collected by Third Asiatic Expedition of American Museum of Natural History with Field Museum cooperating:
- 197 mammals—China.
- Collected by Harold A. White, John Coats, C. J. Albrecht, George E. Carey, Jr. (Harold White-John Coats Abyssinian Expedition of Field Museum):
- 85 mammals, 73 birds, 22 reptiles and batrachians, 4 insects—Abyssinia and Tanganyika Territory.
- Collected by J. E. Williamson and L. L. Pray (Field Museum-Williamson Undersea Expedition to the Bahamas):
- 97 fishes, 1 frog, 502 crabs, shells, corals and sea fans—Bahamas.
- Purchases:
- 4 giant frogs—Cameroon, Africa.
1 Gila monster—Globe, Arizona.
12 mammals—Bolivia.
- 14 frogs, 126 lizards—St. Thomas and British Virgin Islands.
4 peripatus—Trinidad, British West Indies.
1 Rodgers's fulmar—Samoa, California.
2 paroquets—Santa Marta, Colombia.
4 birds—Ecuador.
45 mammal skins and skulls—Ecuador.
6 rodents—Grafton, North Dakota.
3 least weasels—Grafton, North Dakota.
44 birds—various foreign localities.
1 ibis—Merida, Venezuela.
6 fishes.
1 dogfish.
1 large cod.
- FRANZEN, A. J., Chicago.
- 2 Brewer's blackbirds—Richmond, Wisconsin (gift); 25 bird lice—Michigan (gift).
- FRIESSER, JULIUS, Chicago.
- 4 polar bears, 1 leopard—Alaska and Abyssinia (exchange); 1 toad—Schreiber, Ontario (gift).
- GENERAL BIOLOGICAL SUPPLY HOUSE, Chicago.
- 6 fishes—Fort Myers, Florida (gift); 1 salamander, 2 turtles—various localities (gift).
- GRANT, CLEVELAND P., Chicago.
- 1 bald eagle—Michigan City, Indiana (gift).
- GRONEMANN, CARL F., Elgin, Illinois.
- 1 frog—Elgin, Illinois (gift).
- HAGENBECK BROTHERS COMPANY, Stellingen, Germany.
- 1 sea elephant skeleton (gift).
- HIXON, G. C., Chicago.
- 2 mammals—Lake Forest, Illinois (gift).
- JONSTO, MRS. AGNES, Chicago.
- 1 marsh hawk—Willow Springs, Illinois (gift); 1 Tennessee warbler—Chicago (gift).
- KELLEY, J. M., Chicago.
- 1 spotted salamander—Adams, New York (gift).

- KELLOGG, W. K., Battle Creek, Michigan.
1 trumpeter swan, 3 greater snow goose eggs—Augusta, Michigan (gift).
- KENDALL, DR. W. C., Freeport, Maine.
19 tomcod—Casco Bay, Maine (gift).
- KENTUCKY GAME AND FISH COMMISSION, Louisville, Kentucky.
1 spotted tinamou—Kentucky (gift).
- LAMB, E. WENDELL, Bunker Hill, Indiana.
2 water snakes—Bunker Hill, Indiana (gift).
- LETL, FRANK H., Chicago.
2 small mammal skins and skulls, 1 snake—Illinois (gift).
- LEWY, DR. A. M., Chicago.
1 bat, 4 lizards, 2 snakes, 1 frog—Tucson, Arizona (gift).
- LINDAHL, SETH, Chicago.
5 gross shell vials (gift).
- LUNQUIST BROTHERS, Chicago.
1 spider (gift).
- MEDCALF, FRANK, Seattle, Washington.
1 mounted red squirrel—Suffolk, England (gift).
- MOONEY, JAMES, Deerfield, Illinois.
11 salamanders, 1 snake—Deerfield, Illinois (gift).
- MOSELEY, E. L., Bowling Green, Ohio.
2 least weasels—Ohio (gift).
- MUSEUM OF COMPARATIVE ZOOLOGY, Cambridge, Massachusetts.
3 birds—Panama (exchange); 1 bird—Cameroon, Africa (exchange); 2 caecilians—Tanganyika Territory, Africa (exchange).
- MUSSELMAN, T. E., Quincy, Illinois.
1 albino mallard—Quincy, Illinois (gift).
- NEUMANN, OSCAR, Charlottenburg, Germany.
66 birds—South America, Europe, and Asia (exchange).
- NEUSIUS, WILLIAM, Yorkville, Illinois.
1 albino crow—Yorkville, Illinois (gift).
- PALMER, JESSE T., Bocas del Toro, Panama.
1 lizard skin, 1 iguana—Panama (gift).
- PARRISH, LEE H., Tulsa, Oklahoma.
3 rhinoceros iguanas—Haiti (gift).
- PATTERI, ANTHONY, Chicago.
1 belted kingfisher—Chicago (gift).
- PEET, FRED N., Chicago.
3 Canadian brook trout—Canada (gift).
- PETERSEN, MRS. LINA, Ocean Springs, Mississippi.
2 hermit crabs—Horn Island, Mississippi (gift).
- PORTER, F. M., Gladstone, Illinois.
1 woodchuck—Gladstone, Illinois (gift).
- PRAY, L. L., Homewood, Illinois.
1 jumping mouse—Porter County, Indiana (gift).
- RAKLIS, JOHN, Chicago.
1 small boa constrictor—Chicago (gift).
- RAWSON, FREDERICK H., Chicago.
1 mounted trunkfish (gift).
- REED, C. J., Maywood, Illinois.
1 goldfinch—Nugard, Illinois (gift).
- RUSSELL, J. W., Chicago.
1 old squaw duck—Ravinia, Illinois (gift).
- SCHMIDT, F. J. W., Stanley, Wisconsin.
2 mammal skins and skulls—Clark County, Wisconsin (gift); 2 wood turtles—Waupaca, Wisconsin (gift); 20 salamanders, 128 frogs, 12 turtles, 12 turtle eggs, 17 lizards, 104 snakes—Wisconsin (gift).
- SPLAYT, LOUIS J., Chicago.
1 red-tailed hawk—Channon, Illinois (gift).

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- SPRAGUE, COLONEL A. A., Chicago.
2 framed paintings of birds by Louis Agassiz Fuertes (gift).
- STEVENS, MISS ETHEL ELIZABETH, Zamboanga, Philippine Islands.
1 crocodile — Zamboanga, Philippine Islands (gift).
- STUIVE, DERK, Momence, Illinois.
1 snake—Momence, Illinois (gift).
- SVIHLA, A. and R. D., Ann Arbor, Michigan.
2 pikas—Daggett County, Utah (gift).
- VACIN, E. T., Chicago.
1 muskalonge—Moose Lake, Wisconsin (gift).
- WEED, ALFRED C., Chicago.
1 snake—Chicago (gift).
- WILLIAMSON, E. B., Bluffton, Indiana.
106 dragon flies—North and South Americas (gift).
- WOLCOTT, A. B., Downers Grove, Illinois.
1 small rodent—Downers Grove, Illinois (gift).
- WOOD, D. D., Sandakan, British North Borneo.
11 crocodile skulls, 5 snakes, 1 hair ball—British North Borneo (gift).
- WYATT, ALEX. K., Chicago.
5 insects—Illinois and Wisconsin (gift).

RAYMOND DIVISION

- FIELD MUSEUM OF NATURAL HISTORY.
From Division of Photography: 783 slides for extension lectures; 34 negatives for extension lectures; 581 prints for files.
- UNITED FRUIT COMPANY, Boston, Massachusetts.
26 copies of lecture "A Trip to Banana Land," 184 slides (4 sets of 46 each) to illustrate same, 4 slide cases, 1 motion picture reel, 1 reel holder (gift).

DIVISION OF PHOTOGRAPHY

- FIELD, HENRY, Chicago.
480 negatives of natives, landscapes and general views taken in Egypt, Palestine and various European countries (gift).
- FIELD MUSEUM OF NATURAL HISTORY.
Made by Division of Photography: 29,842 prints, 2,217 negatives, 2,268 lantern slides, 309 enlargements, 8 transparent labels, and 9 transparencies for exhibits.
Developed for expeditions: 949 negatives.
Made by B. E. Dahlgren: 1,021 negatives of herbarium specimens, plants, landscapes, seascapes and general views in Pará, Brazil.
Made by Henry Field: 63 negatives of stone implements, etc., at Kish, Mesopotamia.
- Made by C. J. Albrecht: 900 negatives of natives, landscapes, etc., in Central Africa; 24 negatives of members of Harold White-John Coats Abyssinian Expedition with Negus Tafari Makonnen, at Addis Ababa, Abyssinia.
- Made by W. D. Hambly: 573 negatives of natives, domestic animals, landscapes and general views in West Africa; 4,100 feet of motion picture film taken in West Africa.
- Made by R. W. Hendee: 98 negatives of natives and general views in Indo-China.
- Made by Elmer S. Riggs: 1,097 negatives of natives, landscapes and general views in Argentina and Bolivia.
- Made by Sharat K. Roy: 257 negatives of natives, seascapes and general views in Baffin Land and Newfoundland.

Made by Karl P. Schmidt: 200 negatives of natives, landscapes and general views taken on Cornelius Crane Pacific Expedition.

Made by J. Eric Thompson: 458 negatives of natives, landscapes, seascapes and general views in British Honduras.

Made by Llewelyn Williams: 129 negatives of natives and general views in Peru and Brazil.

HANSEN, ERIK K., Chicago.

1 enlarged print of Eskimos in house, Angmagsalik, East Greenland (gift).

LIBRARY

LIST OF DONORS AND EXCHANGES

(Accessions are by exchange, unless otherwise designated)

FOREIGN INSTITUTIONS

AFRICA:

Geological Society, Johannesburg.
Institut d'Égypte, Cairo.
Ministry of Public Works, Cairo.
Natal Museum, Pietermaritzburg.
Rhodesia Museum, Bulawayo.
Royal Society of South Africa, Cape Town.
Société d'Histoire Naturelle de l'Afrique du Nord, Algiers.
Société de Géographie d'Alger, Algiers.
Société des Sciences Naturelles du Maroc, Rabat.
South African Association for the Advancement of Sciences, Cape Town.
South African Department of Agriculture, Pretoria.
South African Museum, Cape Town.

ARGENTINA:

Academia Nacional de Ciencias, Cordova.
Instituto Geográfico Argentina, Buenos Aires.
Ministerio de Agricultura, Buenos Aires.
Sociedad Argentina de Ciencias Naturales, Buenos Aires.
Sociedad Ornitológica del Plata, Buenos Aires.
Sociedad Physis, Buenos Aires.
Universidad Nacional de Tucumán, Tucumán.

AUSTRALIA:

Australian Museum, Sydney.
Botanic Gardens and Government Domains, Sydney.
Commonwealth of Australia, Melbourne.
Department of Agriculture, Adelaide.

Department of Agriculture, Queensland.

Department of Agriculture, Sydney.

Department of Agriculture, Wellington.

Department of Agriculture of Western Australia, Perth.

Department of Fisheries, Sydney.

Department of Mines, Brisbane.

Department of Mines, Sydney.

Department of Public Health, Canberra.

Field Naturalists' Club, Melbourne.

Forestry Commission, Sydney (gift).

Geological Survey of New South Wales, Sydney.

Linnean Society of New South Wales, Sydney.

Melbourne University, Melbourne.

Ornithological Society of South Australia, Adelaide.

Public Library, Museum and Art Gallery, Adelaide.

Public Library, Museum and Art Gallery of Victoria, Melbourne.

Royal Society of Queensland, Brisbane.

Royal Society of South Australia, Adelaide.

Royal Society of Tasmania, Hobart.

Royal Society of Western Australia, Perth.

South Australian Museum, Adelaide.

Technological Museum, Sydney.

AUSTRIA:

Akademie der Wissenschaften, Vienna.

Anthropos Administration, Vienna.

Naturhistorisches Museum, Vienna.

Universität, Vienna.

Verein der Freunde Asiatischer Kunst und Kultur, Vienna.

Zoologisch-Botanische Gesellschaft, Vienna.

BELGIUM:

Académie Royale de Belgique, Brussels.
Académie Royale des Sciences, Brussels.
Direction d'Agriculture, Brussels.
Institut Botanique Léo Errera, Brussels.
Jardin Botanique de l'Etat, Brussels.
Musée Royal d'Histoire de Belgique, Brussels.
Musées Royaux du Cinquenaire, Brussels.
Nederlandsch Phytopathologische (Plantenziekten) Vereenigen, Ghent.
Société Belge de Géologie, Brussels.
Société de Botanique, Brussels.
Société Royale de Sciences, Brussels.
Université de Louvain, Louvain.

BRAZIL:

Biblioteca Nacional, Rio de Janeiro.
Instituto de Butantan, Sao Paulo.
Instituto Oswaldo Cruz, Rio de Janeiro.
Ministerio de Agricultura, Rio de Janeiro.
Museo Nacional, Rio de Janeiro.
Secretaria de Agricultura, Comercio e Obras Publicas, Sao Paulo.
Serviço Geologico e Mineralogico, Rio de Janeiro.

BRITISH GUIANA:

Board of Agriculture, Georgetown.
Forestry Department, Georgetown.
Royal Agricultural and Commercial Society, Demara.

BRITISH WEST INDIES:

Department of Agriculture, Bridgetown, Barbados.
Trinidad and Tobago Department of Agriculture, Port of Spain, Trinidad.

CANADA:

Department of Agriculture, Ottawa, Ontario.
Department of Agriculture, Victoria, British Columbia.
Department of Mines, Ottawa, Ontario.
Department of Mines, Toronto, Ontario.
Department of the Interior, Geological Survey, Ottawa, Ontario.
Entomological Society of Ontario, Toronto, Ontario.
Geological Survey, Ottawa, Ontario.

Horticultural Societies, Toronto, Ontario.
McGill University, Montreal, Quebec.
National Museum, Ottawa, Ontario.
Nova Scotian Institute of Natural Sciences, New Brunswick, Nova Scotia.
Provincial Museum, Toronto, Ontario.
Provincial Museum, Victoria, British Columbia.
Royal Canadian Institute, Toronto, Ontario.
Royal Society of Canada, Ottawa, Ontario.
Université de Montreal, Montreal, Quebec.
University of Toronto, Toronto, Ontario.

CEYLON:

Colombo Museum, Colombo.
Department of Agriculture, Colombo.

CHILE:

Revista de bibliografia, Santiago.
Sociedad Nacional de Minería, Santiago.

CHINA:

Fan Memorial, Institute of Biology, Peiping.
Geological Society, Peiping.
Geological Survey, Peiping.
Metropolitan Library, Peiping.
National Research Institute, Shanghai.
Peiping Union Medical College, Department of Anatomy, Peiping.
Royal Asiatic Society of North China, Shanghai.
Science Society of China, Shanghai.
University of Nanking, Nanking.

COLOMBIA:

Ministerio de Industrias, Bogotá.
Sociedad Colombiana de Ciencias Naturales, Bogotá.

CUBA:

Academia Nacional de Artes y Letras, Havana.
Universidad de Habana, Havana.

CZECHOSLOVAKIA:

Académie Tchèque des Sciences, Prague.
Deutscher Naturwissenschaftlich-Medizinischer Verein für Böhmen
"Lotos," Prague.

DENMARK:

- Dansk Botanisk Forening, Copenhagen.
- Dansk Geologisk Forening, Copenhagen.
- Dansk Naturhistorisk Forening, Copenhagen.
- Dansk Ornithologisk Forening, Copenhagen.
- Société Royale des Antiquaires du Nord, Copenhagen.
- Université, Copenhagen.

ECUADOR:

- Academia Nacional de Historia, Quito.
- Biblioteca Nacional, Quito.

FEDERATED MALAY STATES:

- Federated Malay States Museums, Kuala Lumpur.
- Malayan Agricultural Society, Kuala Lumpur.
- Royal Asiatic Society, Malayan Branch, Singapore.

FIJI ISLANDS:

- Department of Agriculture, Suva.
- Department of History and Ethnology, Suva.
- Fijian Society, Suva.

FINLAND:

- Societas pro Fauna et Flora Fennica, Helsingfors.
- Suomen Museo, Helsingfors.

FRANCE:

- Académie des Sciences, Paris.
- Ecole d'Anthropologie, Paris.
- Musée Guimet, Paris.
- Muséum d'Histoire Naturelle, Lyons.
- Muséum National d'Histoire Naturelle, Paris.
- Nature, Paris.
- Société Botanique de France, Paris.
- Société Dauphinoise d'Ethnologie et d'Anthropologie, Grenoble.
- Société d'Histoire Naturelle d'Ardennes, Ardennes.
- Société d'Histoire Naturelle, Toulouse.
- Société de Géographie, Paris.
- Société des Américanistes, Paris.
- Société Linnéenne, Bordeaux.
- Société Nationale d'Acclimatation de France, Paris.
- Société d'Agriculture, Sciences et Arts, Angers.
- Société Nationale d'Horticulture de France, Paris.

Société Scientifique du Bourbonnais et du Centre de France, Moulins.

GERMANY:

- Akademie der Wissenschaften, Berlin.
- Akademie der Wissenschaften, Heidelberg.
- Akademie der Wissenschaften, Leipzig.
- Bayerische Akademie der Wissenschaften, Munich.
- Bayerische Botanische Gesellschaft, Munich.
- Bayerische Staatsbibliothek, Munich.
- Botanischer Garten und Botanisches Museum, Berlin.
- Botanischer Verein der Provinz Brandenburg, Berlin.
- Deutsche Dendrologische Gesellschaft, Bonn-Poppelsdorf.
- Deutsche Entomologische Gesellschaft, Berlin.
- Deutsche Gesellschaft für Anthropologie, Ethnologie und Urgeschichte, Berlin.
- Deutsche Morgenländische Gesellschaft, Leipzig.
- Deutscher Seefischerei Verein, Berlin.
- Deutsches Entomologisches Institut, Berlin.
- Frankfurter Gesellschaft für Anthropologie, Ethnologie und Urgeschichte, Frankfurt on the Main.
- Geographische Gesellschaft, Hamburg.
- Georg-August-Universität, Göttingen.
- Gesellschaft für Erdkunde, Berlin.
- Gesellschaft für Erdkunde, Leipzig.
- Hamburgische Universität, Hamburg.
- Historischer Verein für Schwaben und Neuburg, Augsburg.
- Mineralogisch-Geologisches Museum, Dresden.
- Museum für Tierkunde und Völkerkunde, Dresden.
- Museum für Völkerkunde, Berlin.
- Museum für Völkerkunde, Hamburg.
- Naturforschende Gesellschaft, Görtitz.
- Naturforschende Gesellschaft, Nuremberg.
- Naturhistorischer Verein der Preussischen Rheinlande und Westfalens, Bonn.

Naturhistorischer Verein für Naturkunde, Wiesbaden.
 Naturwissenschaftlicher Verein, Bremen.
 Ornithologische Gesellschaft in Bayern, Munich.
 Sächsische Akademie der Wissenschaft, Leipzig.
 Senckenbergische Naturforschende Gesellschaft, Frankfurt on the Main.
 Thüringischer Botanischer Verein, Weimar.
 Universitäts Bibliothek, Heidelberg.
 Universitäts Bibliothek, Marburg.
 Universitäts Bibliothek, Munich.
 Universitäts Bibliothek, Tübingen.
 Verein für Vaterländische Naturkunde, Württemberg.
 Verein für Volkskunde, Berlin.
 Zoologisches Museum, Berlin.

GREAT BRITAIN:

Agricultural Experiment Station, Newcastle-upon-Tyne.
 Ashmolean Museum, Oxford.
 Ashmolean Natural History Society, Oxford.
 Birmingham Natural History and Philosophical Society, Birmingham.
 Brighton and Hove Natural History and Philosophical Society, Brighton.
 Bristol Museum, Bristol.
 British Library of Political Science, London.
 British Museum, London.
 British Museum (Natural History), London.
 Cambridge Philosophical Society, Cambridge.
 Cambridge University, Cambridge.
 Dove Marine Laboratory, Cullercoats.
 Fisheries Board, Edinburgh.
 Geological Society, Liverpool.
 Geological Survey of England and Wales, London.
 Geological Survey of Scotland, Edinburgh.
 Geologists' Association, London.
 Hull Museum, Hull.
 Japan Society of London.
 Lancashire Sea Fisheries Laboratory, Liverpool.
 Leicester Museum, Art Gallery and Library, Leicester.
 Linnean Society, London.
 Liverpool Geological Society, Liverpool.
 Liverpool Free Public Museum, Liverpool.
 London School of Economics and Political Science, London.
 Manchester Literary and Philosophical Society, Manchester.
 Manchester Museum, Manchester.
 Marine Biological Association, Plymouth.
 National Indian Association, London.
 National Museum of Wales, Cardiff.
 Oriental Ceramic Society, London (gift).
 Royal Anthropological Institute of Great Britain and Ireland, London.
 Royal Asiatic Society of Great Britain and Ireland, London.
 Royal Botanic Gardens, Kew.
 Royal Colonial Institute, London.
 Royal Geographical Society, London.
 Royal Horticultural Society, London.
 Royal Society, London.
 Royal Society of Arts, London.
 Royal Society of Edinburgh.
 School of Oriental Studies, London.
 South London Entomological and Natural History Society, London.
 Speleological Society, Bristol.
 Tring Zoological Museum, Tring.
 Victoria and Albert Museum, London.
 Wellcome Research Laboratories, London.
 Zoological Society, London.

GUATEMALA:

Sociedad de Geografía é Historia, Guatemala City.

HUNGARY:

Magyar Természettudományi Társulat, Budapest.
 Musée National e Hongrois, Budapest.
 Royal Hungary School of Engineering, Mines and Forests, Budapest.

INDIA:

Anthropological Society, Bombay.
 Archaeological Department, Hyderabad.
 Archaeological Survey, Allahabad.
 Archaeological Survey, Burma, Rangoon.
 Archaeological Survey, Calcutta.
 Archaeological Survey, Madras.
 Asiatic Society of Bengal, Calcutta.
 Bihar and Orissa Research Society, Patna.
 Botanical Survey, Calcutta.
 Department of Agriculture, Bombay.

Department of Agriculture, Madras.
 Department of Agriculture, Poona.
 Department of Agriculture, Pusa.
 Geological, Mining and Metallurgical Society of India, Calcutta.
 Geological Survey, Calcutta.
 Government Cinchona Plantations, Calcutta.
 Government of India, Calcutta.
 Government Museum, Madras.
 Indian Botanical Society, Calcutta.
 Indian Museum, Calcutta.
 Mining and Geological Institute of India, Calcutta.
 Prince of Wales Museum of West India, Bombay.
 Royal Botanic Garden, Calcutta.
 University of Calcutta, Calcutta.
 Zoological Survey of India, Calcutta.

IRELAND:

Belfast Natural History and Philosophical Society, Belfast.
 National Museum, Dublin.
 Royal Irish Academy, Dublin.
 University of Dublin, Dublin.

ITALY:

Istituto di Biologia Marina del Tirreno, Siena.
 Museo Civico di Storia Naturale, Genoa.
 R. Accademia delle Scienze, Naples.
 R. Accademia delle Scienze, Turin.
 R. Accademia Nazionale del Lincei, Rome.
 R. Orto Botanico Giardino Coloniale, Palermo.
 R. Scuola Superiore di Agricoltura, Portici.
 R. Società Geografica Italiana, Rome.
 Società dei Naturalisti, Naples.
 Società di Scienze Naturali ed Economiche, Florence.
 Società Italiana de Scienze Naturali, Milan.
 Società Reale dei Napoli, Naples.
 Società Toscana di Scienze Naturali, Pisa.

JAPAN:

Anthropological Society of Tokio.
 Department of Agriculture of Formosa.
 Deutsche Gesellschaft für Natur- und Völkerkunde Ostasiens, Tokyo.
 Government Research Institute, Taohoku, Formosa.
 Imperial Academy of Tokyo.
 Imperial Geological Society, Tokyo.

Imperial Geological Survey, Tokyo.
 Imperial Household Museums, Tokyo.
 Imperial University, Tokyo.
 Imperial University, College of Agriculture, Kyoto.
 Museum Work Promotion Association, Tokyo.
 Ornithological Society, Tokyo.
 Tohoku Imperial University, Sendai.
 Tokyo Botanical Society, Tokyo.

JAVA:

Bataviaasch Genootschap van Kunsten en Wetenschappen, Batavia.
 Department of Agriculture, Buitenzorg.
 Encyclopaedisch Bureau, Weltevreden.
 Jardin Botanique, Weltevreden.
 K. Natuurkundige Vereeniging in Nederlandsch-Indie, Weltevreden.

MEXICO:

Instituto Geologico de Mexico, Mexico.
 Secretaria de Arqueologia, Historia y Etnografia, Mexico.
 Secretaria de Educacion Publica, Mexico.
 Sociedad Cientifica "Antonio Alzate," Mexico.
 Sociedad de Geografia y Estadistica, Mexico.
 Sociedad Forestal de Mexico, Mexico.
 Sociedad Geologica Mexicana, Mexico.

NETHERLANDS:

Hollandsche Maatschappij der Wetenschappen, Haarlem.
 Kolonial Institute, Amsterdam.
 K. Akademie van Wetenschappen, Amsterdam.
 K. Instituut voor de Taal-Land-en Volkenkunde van Nederlandsch Indie, The Hague.
 K. Nederlandsch Aardrijkundig Genootschap, Amsterdam.
 Landbouwhoogerschool, Wageningen.
 Leiden Museum, Leiden.
 Museum voor Land-en Volkenkunde en Maritiem Museum "Prinz Hendrik," Rotterdam.
 Nederlandsch Vogelkundigen Club, Leiden.
 Rijks Ethnographisch Museum, Leiden.

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Rijks Geologisch-Mineralogisches
Museum, Leiden.
Rijks Herbarium, Leiden.

NEW ZEALAND:

Auckland Institute and Museum,
Wellington.
Canterbury Museum, Christchurch.
Cawthron Institute, Nelson.
Department of Agriculture, Wel-
lington.
Department of Mines, Geological
Survey, Wellington.
New Zealand Board of Sciences and
Art, Wellington.
New Zealand Institute, Wellington.

NORWAY:

Bergen Museum, Bergen.
Ethnographical Museum of Oslo.
Norsk Geologisk Forening, Oslo.
Tromsø Museum, Tromsø.
Zoologiske Museum, Oslo.

PALESTINE:

Institute of Agriculture and Natural
History, Tel-Aviv.
Palestine Oriental Society, Jeru-
salem.

PANAMA:

Gorgas Memorial Institute for Trop-
ical Medicine, Panama.

PARAGUAY:

Sociedad Científica, Asuncion.

PERU:

Universidad, Cuzco.

POLAND:

Académie Polonaise des Sciences et
des Arts, Cracow.
Musei Polonici Historiae Naturali,
Warsaw.
Société Botanique de Pologne, War-
saw.

PORTUGAL:

Universidade de Coimbra, Museu
Zoologico, Coimbra.
Universidade de Lisboa, Lisbon.

ROUMANIA:

Université de Jassy, Jassy.

SPAIN:

Institució Catalana d'Historia Nat-
ural, Barcelona.
Junta para Ampliación de Estudios
e Investigaciones Científicas,
Madrid.

Musei de Ciencias Naturales,
Madrid.

R. Accademia de Ciencias, Madrid.
Sociedad Espanola de Antropologia,
Etnografia y Prehistoria, Madrid.
Sociedad Espanola de Historia Nat-
ural, Madrid.

SWEDEN:

Göologiska Institutet, Stockholm.
Göteborgs Botanika Trädgrad, Göte-
borg.
Göteborgs Museum, Göteborg.
K. Biblioteket, Stockholm.
K. Svenska Vetenskapsakademien,
Stockholm.
K. Vetenskaps-och Vitterhets-
Samhälle, Göteborg.
K. Vitterhets-, Historie-och Antik-
vitetsakademien, Stockholm.
Lunds Universitet, Lund.
Riksmuseets Etnografiska Avedeln-
ing, Stockholm.

SWITZERLAND:

Botanisches Museum, Zürich.
Conservatoire et Jardin Botaniques,
Geneva.
Naturforschende Gesellschaft, Basel.
Naturforschende Gesellschaft,
Zürich.
Naturhistorisches Museum, Basel.
Schweizerische Entomologische
Gesellschaft, Bern.
Société Botanique, Geneva.
Société de Physique et d'Histoire
Naturelle, Geneva.
Société Neuchateloise de Géographie,
Neuchâtel.

UNION OF SOCIALISTIC SOVIET REPUBLICS:

Académie des Sciences, Leningrad.
Botanical Garden, Leningrad.
Latvijos Universitātes Sistematiskā
Zooloģijas Institūtam, Riga.
Musée d'Anthropologie, Leningrad.
Musée Géologique de Minéralogie
Pierre le Grand, Leningrad.
Russian Zoological Journal, Moscow.
Société des Amis des Sciences Nat-
urales, d'Anthropologie et
d'Ethnographie, Moscow.
Société Ouraliennne d'Amis des
Sciences Naturelles, Ekaterin-
berg.
Université de l'Asie Centrale, Tash-
kent.
University of Moscow.
Zoological Museum, Moscow.

URUGUAY:

Museo de Historia Natural, Montevideo.

VENEZUELA:

Cultura Venezolana, Caracas.

DOMESTIC INSTITUTIONS

ALABAMA:

Geological Survey, University.

ARIZONA:

Arizona Museum, Phoenix.

CALIFORNIA:

Agricultural Experiment Station, Berkeley.

Balboa Park Museum, San Diego.

California Academy of Sciences, San Francisco.

Cooper Ornithological Club, Hollywood.

Los Angeles Museum, Los Angeles.

Natural History Museum, San Diego.

Scripps Institution of Biological Research, La Jolla.

Southern California Academy of Sciences, Los Angeles.

Southwest Museum, Los Angeles.

Stanford University, Palo Alto.

State Mining Bureau, Sacramento.

University of California, Berkeley.

University of Southern California, Los Angeles.

COLORADO:

Agricultural Experiment Station, Fort Collins.

Bureau of Mines, Denver.

Colorado College, Colorado Springs.

Colorado Scientific Society, Denver.

State Agricultural College, Fort Collins.

State Historical and Natural History Society, Denver.

CONNECTICUT:

Agricultural Experiment Station, New Haven.

Connecticut Academy of Arts and Sciences, New Haven.

Hartford Public Library, Hartford.

Osborn Botanical Laboratory, New Haven.

State Geological and Natural History Survey, Hartford.

Yale University, New Haven.

DELAWARE:

Agricultural Experiment Station, Wilmington.

FLORIDA:

State Geological Survey, Tallahassee.

GEORGIA:

Geological Survey, Atlanta.

HAWAII:

Academy of Science, Honolulu.

Agricultural Experiment Station, Honolulu.

Bernice Pauahi Bishop Museum, Honolulu.

Hawaiian Historical Society, Honolulu.

Hawaiian Volcano Observatory, Honolulu.

University of Hawaii, Honolulu.

IDAHO:

Inspector of Mines, Butte.

University of Idaho, Moscow.

ILLINOIS:

Agricultural Experiment Station, Urbana.

Art Institute of Chicago.

Avicultural Society of America, Chicago.

Board of Education, Chicago.

Chicago Academy of Sciences, Chicago.

Chicago Public Library, Chicago.

Division of Natural History Survey, Urbana.

Forestry Service, Urbana.

Geographic Society, Chicago.

Hardwood Record, Chicago.

Inland Printer, Chicago (gift).

Izaak Walton League of America, Chicago (gift).

John Crerar Library, Chicago.

Loyola University, Chicago.

Morton Arboretum, Lisle.

Newberry Library, Chicago.

Northwestern University, Evanston.

Open Court Publishing Company, Chicago.

State Board of Agriculture, Springfield.

State Geological Survey, Springfield.

State Historical Library, Springfield.

State Water Survey, Urbana.

University of Chicago.

University of Illinois, Urbana.

INDIANA:

Academy of Sciences, Indianapolis.

Agricultural Experiment Station, Indianapolis.

Indiana Department of Conservation, Indianapolis.

Indiana University, Bloomington.

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John Herron Art Institute, Indianapolis.
Purdue University, Lafayette.
University of Notre Dame, Notre Dame.

IOWA:

Agricultural Experiment Station, Ames.
Historical, Memorial and Art Department, Des Moines.
Iowa Academy of Science, Des Moines.
Iowa Geological Survey, Des Moines.
Iowa Horticultural Society, Des Moines.
Iowa State College of Agriculture, Ames.
University of Iowa, Iowa City.

KANSAS:

Academy of Science, Topeka.
State Board of Agriculture, Lawrence.
University of Kansas, Lawrence.

KENTUCKY:

Agricultural Experiment Station, Louisville.
Kentucky Geological Survey, Frankfort.

LOUISIANA:

Department of Conservation, Baton Rouge.
Tulane University, New Orleans.

MAINE:

Agricultural Experiment Station, Orono.

MARYLAND:

Academy of Science, Baltimore.
Enoch Pratt Free Library, Baltimore.
Johns Hopkins University, Baltimore.
Maryland Institute, Baltimore.
Maryland State Board of Forestry, Baltimore.

MASSACHUSETTS:

Agricultural Experiment Station, Amherst.
American Academy of Arts and Sciences, Boston.
American Antiquarian Society, Worcester.
Boston Public Library, Boston.
Clark University, Worcester.
Essex Institute, Salem.
Harvard College, Museum of Comparative Zoology, Cambridge.

Harvard University, Arnold Arboretum, Jamaica Plain.
Harvard University, Gray Herbarium, Cambridge.
Horticultural Society, Boston.
Museum of Fine Arts, Boston.
New Bedford Public Library, New Bedford.
Peabody Institute, Salem.
Peabody Museum, Cambridge.
Salem Public Library, Salem.
Springfield City Library Association, Springfield.
Williams College, Williamstown.

MICHIGAN:

Agricultural Experiment Station, Agricultural College.
Detroit Institute of Art, Detroit.
Grand Rapids Public Library, Grand Rapids.
Michigan State Library, Lansing.
State Board of Library Commission, Lansing.
Edward K. Warren Foundation, Three Oaks.
University of Michigan, Ann Arbor.

MINNESOTA:

Agricultural Experiment Station, University Farm.
Minneapolis Institute of Arts, Minneapolis.
Minnesota Historical Society, St. Paul.
University of Minnesota, St. Paul.

MISSISSIPPI:

Agricultural Experiment Station, Agricultural College.
Mississippi Plant Board, Agricultural College.

MISSOURI:

Agricultural Experiment Station, Columbia.
Bureau of Geology and Mines, Rolla.
City Art Museum, St. Louis.
Missouri Botanic Garden, St. Louis.
Missouri Historical Society, Columbia.
St. Louis Public Library, St. Louis.
University of Missouri, School of Mines, Rolla.
Washington University, St. Louis.

NEBRASKA:

State University, Lincoln.

NEVADA:

Nevada University, Agricultural Experiment Station, Carson City.

NEW JERSEY:

Agricultural Experiment Station,
Trenton.
Newark Museums Association,
Newark.
Princeton University, Princeton.

NEW MEXICO:

Agricultural Experiment Station,
Santa Fe.
Historical Society, Santa Fe.
New Mexico Museum, Santa Fe.

NEW YORK:

Agricultural Experiment Station,
Geneva.
American Academy of Rome, New
York.
American Geographical Society,
New York.
American Museum of Natural His-
tory, New York.
American Polish Chamber of Com-
merce, New York (gift).
Bingham Oceanographic Collection,
New York (gift).
Brooklyn Botanic Garden, Brooklyn.
Brooklyn Institute of Arts and
Sciences, Brooklyn.
Buffalo Society of Natural Sciences,
Buffalo.
Columbia University, New York.
Cornell University, Ithaca.
Garden Club of America, New York
(gift).
Italy-American Society, New York
(gift).
Japan Society, New York.
Metropolitan Museum of Art, New
York.
Municipal Museum, Rochester.
Museum of the American Indian,
New York.
New York Academy of Sciences,
New York.
New York Botanical Garden, New
York.
New York Historical Society, New
York.
New York State Library, Albany.
New York University, New York.
Plastic Publications, New York
(gift).
Pratt Institute, New York.
Public Library, New York.
Rockefeller Foundation, New York
(gift).
State College of Forestry, Syracuse.
State Museum, Albany.
Staten Island Institution of Arts
and Sciences, New York.

Stone Publishing Company, New
York (gift).
Tompkins-Kiel Marble Company,
New York (gift).
United Fruit Company, New York
(gift).
University of the State of New York,
Albany.
Vanderbilt Marine Museum, New
York (gift).
Vassar College, Poughkeepsie.
Zoological Society, New York.

NORTH CAROLINA:

Duke University, Durham.
Elisha Mitchell Scientific Society,
Chapel Hill.

NORTH DAKOTA:

State Historical Society, Bismarck.
University of North Dakota, Uni-
versity.

OHIO:

Agricultural Experiment Station,
Wooster.
Cincinnati Museums Association,
Cincinnati.
Cleveland Museum of Art, Cleve-
land.
Cleveland Museum of Natural His-
tory, Cleveland.
Cleveland Public Library, Cleve-
land.
Denison University, Granville.
Oberlin College, Oberlin.
Ohio Academy of Science, Columbus.
Ohio Archaeological and Historical
Society, Columbus.
Ohio State Museum, Columbus.
Ohio State University, Columbus.
University of Cincinnati, Cincinnati.
Wilson Ornithological Club, Oberlin.

OKLAHOMA:

Oklahoma Academy of Sciences,
Norman.
Oklahoma Geological Survey, Nor-
man.
University of Oklahoma, Norman.

OREGON:

Agricultural Experiment Station,
Corvallis.
State College, Corvallis.
University of Oregon, Eugene.

PENNSYLVANIA:

Academy of Natural Sciences, Phila-
delphia.
Agricultural Experiment Station,
Harrisburg.

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American Philosophical Society,
Philadelphia.

Antivenin Institute of America,
Philadelphia.

Bureau of Topographical and Geo-
logical Survey, Harrisburg.

Carnegie Institute, Pittsburgh.

Carnegie Museum, Pittsburgh.

Department of Agriculture, Harris-
burg.

Department of Forests and Waters,
Harrisburg.

Engineers' Society of Western Penn-
sylvania, Pittsburgh.

Erie Public Museum, Erie.

Franklin Institute, Philadelphia.

Pennsylvania Museum and School
of Industrial Art, Philadelphia.

Philadelphia College of Pharmacy,
Philadelphia.

Sullivant Moss Society, Pittsburgh.

University of Pennsylvania, Phila-
delphia.

University of Pennsylvania, Mu-
seum, Philadelphia.

Wagner Free Institute of Science,
Philadelphia.

Wistar Institute of Anatomy and
Biology, Philadelphia.

PHILIPPINE ISLANDS:

Bureau of Education, Manila.

Bureau of Science, Manila.

Department of Agriculture and
Natural Resources, Manila.

Department of Interior, Manila.

RHODE ISLAND:

Roger Williams Park Museum, Provi-
dence.

SOUTH DAKOTA:

State School of Mines, Rapid City.

TENNESSEE:

Agricultural Experiment Station,
Nashville.

TEXAS:

Agricultural Experiment Station,
College Station.

Baylor University, Waco.

Scientific Society, San Antonio.

University of Texas, Austin.

UTAH:

Agricultural Experiment Station,
Logan.

University of Utah, Salt Lake City.

VERMONT:

Agricultural Experiment Station,
Burlington.

Geological Survey, Burlington.

VIRGINIA:

State Library, Richmond.

University of Virginia, Charlottes-
ville.

WASHINGTON (State of):

Agricultural Experiment Station,
Seattle.

Mountaineer Club, Seattle.

Pacific Northwest Bird and Mammal
Society, Seattle.

Puget Sound Biological Station,
Seattle.

Washington University, Seattle.

Washington University, Historical
Society, Seattle.

WASHINGTON, D.C.:

American Association for the Ad-
vancement of Science.

American Association of Museums.

American Mining Congress.

Archaeological Institute of America.

Carnegie Institution of Washington
(gift).

Library of Congress.

National Academy of Science.

National Parks Bulletin.

National Research Council.

Pan-American Union.

Science Service.

Smithsonian Institution.

Tropical Plant Research Foundation.

United States Government.

United States National Museum.

WEST VIRGINIA:

Academy of Science, Morgantown.

Geological Survey, Morgantown.

State Department of Agriculture,
Charleston.

West Virginia University, Morgan-
town.

WISCONSIN:

Agricultural Experiment Station,
Madison.

Beloit College, Beloit.

Logan Museum, Beloit.

Public Museum of Milwaukee.

State Horticultural Society, Madi-
son.

University of Wisconsin, Madison.

Wisconsin Academy of Arts, Sciences
and Letters, Madison.

Wisconsin Archaeological Society,
Madison.

WYOMING:

Wyoming University, Laramie.

INDIVIDUALS

(Accessions are by gift unless otherwise designated)

- Aldrich, J. M., Washington, D.C.
Allen, T. George, Chicago.
Ames, Oakes, Cambridge, Massachusetts.
Baker, Frank C., Urbana, Illinois.
Barnes, R. Magoon, Lacon, Illinois.
Bassler, R. S., Washington, D.C.
Beaux, Oscar de, Geneva, Switzerland (exchange).
Bennett, Neville, London, England.
Birkel, Emil, Stavanger, Norway (exchange).
Blake, S. F., Washington, D.C. (exchange).
Boas, Franz, New York (exchange).
Boerschmann, Ernst.
Bokor, Michael, Chicago.
Borden, John, Chicago.
Borodin, Nichols, Cambridge, Massachusetts.
Braschi Silvio, A., Caracas, Venezuela.
Brown, Charles E., Madison, Wisconsin (exchange).
Buscaloni, Luigi, Bologna, Italy (exchange).
Cockerell, T. D. A., Boulder, Colorado (exchange).
Codazzi, Ricardo L., Bogotá, Colombia (exchange).
Cook, Harold J., Agate, Colorado.
Coolidge, Harold J., Jr., Cambridge, Massachusetts.
Crane, Cornelius V., Chicago.
Dickey, Donald R., Pasadena, California (exchange).
Dohmen, U. A., Chicago.
Domin, Karel, Prague, Czechoslovakia (exchange).
Emerson, Alfred E., Chicago.
Farley, M. F., Foochow, China (exchange).
Farwell, Oliver A., Detroit, Michigan.
Field, Henry, Chicago.
Field, Stanley, Chicago.
Frankfort, H., London, England.
Friedlander und Sohn, Berlin, Germany.
Garvin, Mr. and Mrs. Francis P., Roslyn, Illinois.
Gerhard, William J., Chicago.
Gillette, G. F., Boston, Massachusetts.
Gladwin, Harold S., Pasadena, California.
Gleerup, C. W. K., Lund, Sweden.
Hartert, Ernst, Berlin, Germany (exchange).
Herter, Guillermo, Montevideo, Uruguay.
Hicken, C. M., Buenos Aires, Argentina (exchange).
Hinsdale, Wilfert D., Ann Arbor, Michigan (gift).
Hobbs, William H., Ann Arbor, Michigan.
Hubbs, Carl L., Ann Arbor, Michigan (exchange).
Hungerford, H. B., Lawrence, Kansas.
Jijon y Camaanano, J., Quito, Ecuador.
Jillson, Willard R., Frankfort, Kentucky.
Jones, David T., Marietta, Ohio.
Judd, Neil M., Washington, D.C. (exchange).
Kellogg, John P., Chicago.
Kenyon, A. S.
Kinghorn, J. R., Sydney, Australia.
Krenner, Josef, Budapest, Hungary.
Kukenthal, Willy, Coburg, Germany.
Lahille, F., Buenos Aires, Argentina.
Landis, D. H., Windom, England.
Langdon, Stephen, Oxford, England.
Laufer, Berthold, Chicago.
Lewis, A. B., Chicago.
Love, Charles A., Aurora, Illinois.
Meek, Alexander, Durham, England.
Mertens, Robert, Frankfort on the Main, Germany.
Mexia, Ynes, Berkeley, California.
Meylan, O., Geneva, Switzerland.
Moorehead, Warren, Andover, Massachusetts (exchange).
Morrison, J. P. E., Madison, Wisconsin.
Müller, Lorenz, Munich, Germany (exchange).
Nichols, H. W., Chicago.
Oliveira, Euzebio Paulo de, Rio de Janeiro, Brazil.
Osgood, Wilfred H., Chicago.
Outes, Felix F., Buenos Aires, Argentina.
Penrose, R. A. F., Jr., Philadelphia, Pennsylvania (exchange).
Peters, James L., Cambridge, Massachusetts (exchange).
Peterson, O. A., Pittsburgh, Pennsylvania (exchange).
Pittier, Henry, Caracas, Venezuela (exchange).

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- Pollock, James B., Ann Arbor, Michigan.
- Pospisil, Frantisek, Brünn, Austria.
- Prater, S. H., Bombay, India.
- Proctor, William, Philadelphia, Pennsylvania.
- Prout, A. E., London, England.
- Putnam, Edward R., Davenport, Iowa.
- Riggs, Elmer S., Chicago.
- Rivet, Paul, Paris, France (exchange).
- Roberts, George, Lake Forest, Illinois.
- Roddy, H. Justin, Lancaster, England.
- Roth, Walter E., Christianburg, Sweden (exchange).
- Rusconi, Carlos, Buenos Aires, Argentina.
- St. John, Harold, Seattle, Washington.
- Schinz, Hans, Zürich, Switzerland (exchange).
- Schlaginhaufen, Otto, Zürich, Switzerland (exchange).
- Schmidt, Karl P., Chicago.
- Schuller, Rudolph, San José, Costa Rica.
- Sergi, Giuseppe, Rome, Italy (exchange).
- Sherff, Earl E., Chicago.
- Simms, Stephen C., Chicago.
- Staley, Forest H., St. Louis, Missouri.
- Standley, Paul C., Chicago.
- Strand, Embrik, St. Riga, U.S.S.R.
- Sushkin, Alexander, Detroit, Michigan.
- Talbot, G.
- Tanaka, Shigeho, Tokyo, Japan (exchange).
- Thalbitzer, W., Copenhagen, Denmark.
- Thelen, Rolf, Madison, Wisconsin.
- Thompson, J. Eric, Chicago.
- Todd, W. E. Clyde, Pittsburgh, Pennsylvania (exchange).
- Voborsky, Josef K., Chicago.
- Walsh, George B., Scarborough, England (exchange).
- Watson, Elba E., East Lansing, Michigan.
- Weeks, A. G., Jr., Boston, Massachusetts.
- Winsor, Henry, Philadelphia, Pennsylvania.
- Wood, F. E., Chicago.
- Zimanyi, Karl, Budapest, Hungary (exchange).
- Zimmer, John T., Chicago.

ARTICLES OF INCORPORATION

STATE OF ILLINOIS

DEPARTMENT OF STATE

WILLIAM H. HINRICHSEN, *Secretary of State*

TO ALL TO WHOM THESE PRESENTS SHALL COME, GREETING:

Whereas, a Certificate duly signed and acknowledged having been filed in the office of the Secretary of State, on the 16th day of September, A.D. 1893, for the organization of the COLUMBIAN MUSEUM OF CHICAGO, under and in accordance with the provisions of "An Act Concerning Corporations," approved April 18, 1872, and in force July 1, 1872, and all acts amendatory thereof, a copy of which certificate is hereto attached.

Now, therefore, I, William H. Hinrichsen, Secretary of State of the State of Illinois, by virtue of the powers and duties vested in me by law, do hereby certify that the said COLUMBIAN MUSEUM OF CHICAGO is a legally organized Corporation under the laws of this State.

In Testimony Whereof, I hereto set my hand and cause to be affixed the Great Seal of State. Done at the City of Springfield, this 16th day of September, in the year of our Lord one thousand eight hundred and ninety-three, and of the Independence of the United States the one hundred and eighteenth.

W. H. HINRICHSEN,

[SEAL]

Secretary of State.

TO HON. WILLIAM H. HINRICHSEN,

SECRETARY OF STATE:

SIR:

We, the undersigned citizens of the United States, propose to form a corporation under an act of the General Assembly of the State of Illinois, entitled "An Act Concerning Corporations," approved April 18, 1872, and all acts amendatory thereof; and that for the purposes of such organization we hereby state as follows, to-wit:

1. The name of such corporation is the "COLUMBIAN MUSEUM OF CHICAGO."

2. The object for which it is formed is for the accumulation and dissemination of knowledge, and the preservation and exhibition of objects illustrating Art, Archaeology, Science and History.

3. The management of the aforesaid museum shall be vested in a Board of FIFTEEN (15) TRUSTEES, five of whom are to be elected every year.

4. The following named persons are hereby selected as the Trustees for the first year of its corporate existence:

Edward E. Ayer, Charles B. Farwell, George E. Adams, George R. Davis, Charles L. Hutchinson, Daniel H. Burnham, John A. Roche, M. C. Bullock, Emil G. Hirsch, James W. Ellsworth, Allison V. Armour, O. F. Aldis, Edwin Walker, John C. Black and Frank W. Gunsaulus.

5. The location of the Museum is in the City of Chicago, County of Cook, and State of Illinois.

(Signed)

George E. Adams, C. B. Farwell, Sidney C. Eastman, F. W. Putnam, Robert McCurdy, Andrew Peterson, L. J. Gage, Charles L. Hutchinson, Ebenezer

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Buckingham, Andrew McNally, Edward E. Ayer, John M. Clark, Herman H. Kohlsaatt, George Schneider, Henry H. Getty, William R. Harper, Franklin H. Head, E. G. Keith, J. Irving Pearce, Azel F. Hatch, Henry Wade Rogers, Thomas B. Bryan, L. Z. Leiter, A. C. Bartlett, A. A. Sprague, A. C. McClurg, James W. Scott, Geo. F. Bissell, John R. Walsh, Chas. Fitzsimmons, John A. Roche, E. B. McCagg, Owen F. Aldis, Ferdinand W. Peck, James H. Dole, Joseph Stockton, Edward B. Butler, John McConnell, R. A. Waller, H. C. Chatfield-Taylor, A. Crawford, Wm. Sooy Smith, P. S. Peterson, John C. Black, Jno. J. Mitchell, C. F. Gunther, George R. Davis, Stephen A. Forbes, Robert W. Patterson, Jr., M. C. Bullock, Edwin Walker, George M. Pullman, William E. Curtis, James W. Ellsworth, William E. Hale, Wm. T. Baker, Martin A. Ryerson, Huntington W. Jackson, N. B. Ream, Norman Williams, Melville E. Stone, Bryan Lathrop, Eliphalet W. Blatchford, Philip D. Armour.

STATE OF ILLINOIS }
COOK COUNTY } SS.

I, G. R. MITCHELL, a NOTARY PUBLIC in and for said County, do hereby certify that the foregoing petitioners personally appeared before me and acknowledged severally that they signed the foregoing petition as their free and voluntary act for the uses and purposes therein set forth.

Given under my hand and notarial seal this 14th day of September, 1893.

G. R. MITCHELL,
[SEAL] NOTARY PUBLIC, COOK COUNTY, ILL.

CHANGE OF NAME

Pursuant to a resolution passed at a meeting of the corporate members held the 25th day of June, 1894, the name of the COLUMBIAN MUSEUM was changed to FIELD COLUMBIAN MUSEUM. A certificate to this effect was filed June 26, 1894, in the office of the Secretary of State for Illinois.

CHANGE OF NAME

Pursuant to a resolution passed at a meeting of the corporate members held the 8th day of November, 1905, the name of the FIELD COLUMBIAN MUSEUM was changed to FIELD MUSEUM OF NATURAL HISTORY. A certificate to this effect was filed November 10, 1905, in the office of the Secretary of State for Illinois.

CHANGE IN ARTICLE 3

Pursuant to a resolution at a meeting of the corporate members held the 10th day of May, 1920, the management of FIELD MUSEUM OF NATURAL HISTORY shall be invested in a Board of TWENTY-ONE (21) TRUSTEES, who shall be elected in such manner and for such time and term of office as may be provided for by the By-Laws. A certificate to this effect was filed May 21, 1920, in the office of the Secretary of State for Illinois.

AMENDED BY-LAWS

JANUARY 1930

ARTICLE I

MEMBERS

SECTION 1. Members shall be of eleven classes, Corporate Members, Honorary Members, Patrons, Benefactors, Fellows, Life Members, Non-Resident Life Members, Associate Members, Non-Resident Associate Life Members, Sustaining Members, and Annual Members.

SECTION 2. The Corporate Members shall consist of the persons named in the articles of incorporation, and of such other persons as shall be chosen from time to time by the Board of Trustees at any of its meetings, upon the recommendation of the Executive Committee; provided, that such person named in the articles of incorporation shall, within ninety days from the adoption of these By-Laws, and persons hereafter chosen as Corporate Members shall, within ninety days of their election, pay into the treasury the sum of Twenty Dollars (\$20.00) or more. Corporate Members becoming Life Members, Patrons or Honorary Members shall be exempt from dues. Annual meetings of said Corporate Members shall be held at the same place and on the same day that the annual meeting of the Board of Trustees is held.

SECTION 3. Honorary Members shall be chosen by the Board from among persons who have rendered eminent service to science, and only upon unanimous nomination of the Executive Committee. They shall be exempt from all dues.

SECTION 4. Patrons shall be chosen by the Board upon recommendation of the Executive Committee from among persons who have rendered eminent service to the Museum. They shall be exempt from all dues, and, by virtue of their election as Patrons, shall also be Corporate Members.

SECTION 5. Any person contributing or devising the sum of One Hundred Thousand Dollars (\$100,000.00) in cash, or securities, or property to the funds of the Museum, may be elected a Benefactor of the Museum.

SECTION 6. Any person contributing the sum of Five Thousand Dollars (\$5,000.00) in cash or securities to the funds of the Museum, may be elected a Fellow of the Museum, who after being so elected shall have the right in perpetuity to appoint the successor in said Fellowship.

SECTION 7. Any person paying into the treasury the sum of Five Hundred Dollars (\$500.00), at any one time, shall, upon the unanimous vote of the Board, become a Life Member. Life Members shall be exempt from all dues, and shall enjoy all the privileges and courtesies of the Museum that are accorded to members of the Board of Trustees. Any person residing fifty miles or more from the city of Chicago, paying into the treasury the sum of One Hundred Dollars (\$100.00) at any one time, shall, upon the unanimous vote of the Board, become a Non-Resident Life Member. Non-Resident Life Members shall be exempt from all dues, and shall enjoy all the privileges and courtesies of the Museum that are accorded to members of the Board of Trustees.

SECTION 8. Any person paying into the treasury of the Museum the sum of One Hundred Dollars (\$100.00), at any one time, shall, upon the unanimous vote of the Board, become an Associate Member. Associate Members shall be entitled to: tickets admitting member and members of family, including non-resident home guests; all publications of the Museum, if so desired; reserved seats for all lectures and entertainments under the auspices of the Museum, provided reservation is requested in advance; and admission of holder of membership and accompanying party to all special exhibits and Museum functions day or evening. Any person residing fifty miles or more from the city of Chicago, paying into the treasury the sum of Fifty Dollars (\$50.00) at any one time, shall, upon the unanimous vote of the Board, become a Non-Resident Associate Life

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Member. Non-Resident Associate Life Members shall be exempt from all dues, and shall enjoy all the privileges and courtesies of the Museum that are accorded to Associate Members.

SECTION 9. Sustaining Members shall consist of such persons as are selected from time to time by the Board of Trustees at any of its meetings, and who shall pay an annual fee of Twenty-five Dollars (\$25.00), payable within thirty days after notice of election and within thirty days after each recurring annual date. This Sustaining Membership entitles the member to free admission for the member and family to the Museum on any day, the Annual Report and such other Museum documents or publications as may be requested in writing. When a Sustaining Member has paid the annual fee of \$25.00 for six years, such member shall be entitled to become an Associate Member.

SECTION 10. Annual Members shall consist of such persons as are selected from time to time by the Board of Trustees at any of its meetings, and who shall pay an annual fee of Ten Dollars (\$10.00), payable within thirty days after each recurring annual date. An Annual Membership shall entitle the member to a card of admission for the member and family during all hours when the Museum is open to the public, and free admission for the member and family to all Museum lectures or entertainments. This membership will also entitle the holder to the courtesies of the membership privileges of every Museum of note in the United States and Canada, so long as the existing system of co-operative interchange of membership tickets shall be maintained, including tickets for any lectures given under the auspices of any of the Museums during a visit to the cities in which the cooperative museums are located.

SECTION 11. All membership fees, excepting Sustaining and Annual, shall hereafter be applied to a permanent Membership Endowment Fund, the interest only of which shall be applied for the use of the Museum as the Board of Trustees may order.

ARTICLE II

BOARD OF TRUSTEES

SECTION 1. The Board of Trustees shall consist of twenty-one members. The respective members of the Board now in office, and those who shall hereafter be elected, shall hold office during life. Vacancies occurring in the Board shall be filled at a regular meeting of the Board, upon the nomination of the Executive Committee made at a preceding regular meeting of the Board, by a majority vote of the members of the Board present.

SECTION 2. Regular meetings of the Board shall be held on the third Monday of each month. Special meetings may be called at any time by the President, and shall be called by the Secretary upon the written request of three Trustees. Five Trustees shall constitute a quorum, except for the election of officers or the adoption of the Annual Budget, when seven Trustees shall be required, but meetings may be adjourned by any less number from day to day, or to a day fixed, previous to the next regular meeting.

SECTION 3. Reasonable written notice, designating the time and place of holding meetings, shall be given by the Secretary.

ARTICLE III

HONORARY TRUSTEES

SECTION 1. As a mark of respect, and in appreciation of services performed for the Institution, those Trustees who by reason of inability, on account of change of residence, or for other cause or from indisposition to serve longer in such capacity shall resign their place upon the Board, may be elected, by a majority of those present at any regular meeting of the Board, an Honorary Trustee for life. Such Honorary Trustee will receive notice of all meetings of the Board of Trustees, whether regular or special, and will be expected to be present at all such meetings and participate in the deliberations thereof, but an Honorary Trustee shall not have the right to vote.

ARTICLE IV

OFFICERS

SECTION 1. The officers shall be a President, a First Vice-President, a Second Vice-President, a Third Vice-President, a Secretary, an Assistant Secretary and a Treasurer. They shall be chosen by ballot by the Board of Trustees, a majority of those present and voting being necessary to elect. The President, the First Vice-President, the Second Vice-President, and the Third Vice-President shall be chosen from among the members of the Board of Trustees. The meeting for the election of officers shall be held on the third Monday of January of each year, and shall be called the Annual Meeting.

SECTION 2. The officers shall hold office for one year, or until their successors are elected and qualified, but any officer may be removed at any regular meeting of the Board of Trustees by a vote of two-thirds of all the members of the Board. Vacancies in any office may be filled by the Board at any meeting.

SECTION 3. The officers shall perform such duties as ordinarily appertain to their respective offices, and such as shall be prescribed by the By-Laws, or designated from time to time by the Board of Trustees.

ARTICLE V

THE TREASURER

SECTION 1. The Treasurer shall be custodian of the funds of the Corporation except as hereinafter provided. He shall make disbursements only upon warrants drawn by the Director and countersigned by the President. In the absence or inability of the Director, warrants may be signed by the Chairman of the Finance Committee, and in the absence or inability of the President, may be countersigned by one of the Vice-Presidents, or any member of the Finance Committee.

SECTION 2. The securities and muniments of title belonging to the corporation shall be placed in the custody of some Trust Company of Chicago to be designated by the Board of Trustees, which Trust Company shall collect the income and principal of said securities as the same become due, and pay same to the Treasurer, except as hereinafter provided. Said Trust Company shall allow access to and deliver any or all securities or muniments of title to the joint order of the following officers, namely The President or one of the Vice-Presidents, jointly with the Chairman, or one of the Vice-Chairmen, of the Finance Committee of the Museum.

SECTION 3. The Treasurer shall give bond in such amount, and with such sureties as shall be approved by the Board of Trustees.

SECTION 4. The Harris Trust & Savings Bank of Chicago shall be Custodian of "The N. W. Harris Public School Extension of Field Museum" fund. The bank shall make disbursements only upon warrants drawn by the Director and countersigned by the President. In the absence or inability of the Director, warrants may be signed by the Chairman of the Finance Committee, and in the absence or inability of the President, may be countersigned by one of the Vice-Presidents, or any member of the Finance Committee.

ARTICLE VI

THE DIRECTOR

SECTION 1. The Board of Trustees shall elect a Director of the Museum, who shall remain in office until his successor shall be elected. He shall have immediate charge and supervision of the Museum, and shall control the operations of the Institution, subject to the authority of the Board of Trustees and its Committees. The Director shall be the official medium of communication between the Board, or its Committees, and the scientific staff and maintenance force.

SECTION 2. There shall be four scientific Departments of the Museum—Anthropology, Botany, Geology and Zoology; each under the charge of a

Curator, subject to the authority of the Director. The Curators shall be appointed by the Board upon the recommendation of the Director, and shall serve during the pleasure of the Board. Subordinate staff officers in the scientific Departments shall be appointed and removed by the Director upon the recommendation of the Curators of the respective Departments. The Director shall have authority to employ and remove all other employees of the Museum.

SECTION 3. The Director shall make report to the Board at each regular meeting, recounting the operations of the Museum for the previous month. At the Annual Meeting, the Director shall make an Annual Report, reviewing the work for the previous year, which Annual Report shall be published in pamphlet form for the information of the Trustees and Members, and for free distribution in such number as the Board may direct.

ARTICLE VII

AUDITOR

SECTION 1. The Board shall appoint an Auditor, who shall hold his office during the pleasure of the Board. He shall keep proper books of account, setting forth the financial condition and transactions of the Corporation, and of the Museum, and report thereon at each regular meeting, and at such other times as may be required by the Board. He shall certify to the correctness of all bills rendered for the expenditure of the money of the Corporation.

ARTICLE VIII

COMMITTEES

SECTION 1. There shall be five Committees, as follows: Finance, Building, Auditing, Pension and Executive.

SECTION 2. The Finance Committee shall consist of five members, the Auditing and Pension Committees shall each consist of three members, and the Building Committee shall consist of five members. All members of these four Committees shall be elected by ballot by the Board at the Annual Meeting, and shall hold office for one year, and until their successors are elected and qualified. In electing the members of these Committees, the Board shall designate the Chairman and Vice-Chairman by the order in which the members are named in the respective Committee; the first member named shall be Chairman, the second named the Vice-Chairman, and the third named, Second Vice-Chairman, succession to the Chairmanship being in this order in the event of the absence or disability of the Chairman.

SECTION 3. The Executive Committee shall consist of the President of the Board, the Chairman of the Finance Committee, the Chairman of the Building Committee, the Chairman of the Auditing Committee, the Chairman of the Pension Committee, and three other members of the Board to be elected by ballot at the Annual Meeting.

SECTION 4. Four members shall constitute a quorum of the Executive Committee, and in all standing Committees two members shall constitute a quorum. In the event that, owing to the absence or inability of members, a quorum of the regular elected members cannot be present at any meeting of any Committee, then the Chairman thereof, or his successor, as herein provided, may summon any members of the Board of Trustees to act in place of the absentee.

SECTION 5. The Finance Committee shall have supervision of investing the endowment and other permanent funds of the Corporation, and the care of such real estate as may become its property. It shall have authority to invest, sell, and reinvest funds, subject to the approval of the Board.

SECTION 6. The Building Committee shall have supervision of the construction, reconstruction, and extension of any and all buildings used for Museum purposes.

SECTION 7. The Executive Committee shall be called together from time to time as the Chairman may consider necessary, or as he may be requested

to do by three members of the Committee, to act upon such matters affecting the administration of the Museum as cannot await consideration at the Regular Monthly Meetings of the Board of Trustees. It shall, before the beginning of each fiscal year, prepare and submit to the Board an itemized Budget, setting forth the probable receipts from all sources for the ensuing year, and make recommendations as to the expenditures which should be made for routine maintenance and fixed charges. Upon the adoption of the Budget by the Board, the expenditures as stated are authorized.

SECTION 8. The Auditing Committee shall have supervision over all accounting and bookkeeping, and full control of the financial records. It shall cause the same, once each year, or oftener, to be examined by an expert individual or firm, and shall transmit the report of such expert individual or firm to the Board at the next ensuing regular meeting after such examination shall have taken place.

SECTION 9. The Pension Committee shall determine by such means and processes as shall be established by the Board of Trustees to whom and in what amount the Pension Fund shall be distributed. These determinations or findings shall be subject to the approval of the Board of Trustees.

SECTION 10. The Chairman of each Committee shall report the acts and proceedings thereof at the next ensuing regular meeting of the Board.

SECTION 11. The President shall be ex-officio a member of all Committees and Chairman of the Executive Committee. Vacancies occurring in any Committee may be filled by ballot at any regular meeting of the Board.

ARTICLE IX

NOMINATING COMMITTEE

SECTION 1. At the November meeting of the Board each year, a Nominating Committee of three shall be chosen by lot. Said Committee shall make nominations for membership of the Finance Committee, the Building Committee, the Auditing Committee, and the Pension Committee, and for three members of the Executive Committee, from among the Trustees, to be submitted at the ensuing December meeting and voted upon at the following Annual Meeting in January.

ARTICLE X

SECTION 1. Whenever the word "Museum" is employed in the By-Laws of the Corporation, it shall be taken to mean the building in which the Museum as an Institution is located and operated, the material exhibited, the material in study collections, or in storage, furniture, fixtures, cases, tools, records, books, and all appurtenances of the Institution and the workings, researches, installations, expenditures, field work, laboratories, library, publications, lecture courses, and all scientific and maintenance activities.

SECTION 2. These By-Laws may be amended at any regular meeting of the Board of Trustees by a two-thirds vote of all the members present, provided the amendment shall have been proposed at a preceding regular meeting.

FOUNDER

*MARSHALL FIELD

BENEFACTORS

Those who have contributed \$100,000 or more to the Museum

- | | |
|--------------------------|---------------------------|
| *AYER, EDWARD E. | HARRIS, ALBERT W. |
| BUCKINGHAM, MISS KATE S. | *HARRIS, NORMAN W. |
| CRANE, CORNELIUS | *HIGINBOTHAM, HARLOW N. |
| CRANE, RICHARD T., JR. | KELLEY, WILLIAM V. |
| | *PULLMAN, GEORGE M. |
| *FIELD, JOSEPH N. | RAYMOND, MRS. ANNA LOUISE |
| FIELD, MARSHALL | *RAYMOND, JAMES NELSON |
| FIELD, STANLEY | SIMPSON, JAMES |
| GRAHAM, ERNEST R. | *STURGES, MRS. MARY D. |
| *DECEASED | |

HONORARY MEMBERS

Those who have rendered eminent service to Science

- | | |
|------------------------------|-------------------------------|
| AYER, MRS. EDWARD E. | LUDWIG, H. R. H. GUSTAF ADOLF |
| BREASTED, PROFESSOR JAMES H. | CROWN PRINCE OF SWEDEN |
| CHALMERS, WILLIAM J. | MCCORMICK, STANLEY |
| CRANE, CHARLES R. | RAWSON, FREDERICK H. |
| CRANE, RICHARD T., JR. | ROOSEVELT, KERMIT |
| CUTTING, C. SUYDAM | ROOSEVELT, THEODORE |
| FIELD, MARSHALL | ROSENWALD, JULIUS |
| FIELD, STANLEY | RYERSON, MARTIN A. |
| GRAHAM, ERNEST R. | SARGENT, HOMER E. |
| HARRIS, ALBERT W. | SIMPSON, JAMES |
| KELLEY, WILLIAM V. | SPRAGUE, ALBERT A. |

DECEASED, 1929

- | | |
|----------------|----------------------------|
| KEEP, CHAUNCEY | ROSENWALD, MRS. AUGUSTA N. |
|----------------|----------------------------|

PATRONS

Those who have rendered eminent service to the Museum

- | | |
|------------------------------|----------------------------|
| ARMOUR, ALLISON V. | KNIGHT, CHARLES R. |
| BORLAND, MRS. JOHN JAY | KUNZ, GEORGE F. |
| CHADBOURNE, MRS. EMILY CRANE | LANGDON, PROFESSOR STEPHEN |
| CHERRIE, GEORGE K. | MARKHAM, CHARLES H. |
| COATS, JOHN | MOORE, MRS. WILLIAM H. |
| COLLINS, ALFRED M. | PAYNE, JOHN BARTON |
| CONOVER, BOARDMAN | PROBST, EDWARD |
| CUMMINGS, MRS. ROBERT F. | RAWSON, FREDERICK H. |
| CUTTING, C. SUYDAM | ROOSEVELT, KERMIT |
| DAY, LEE-GARNETT | ROOSEVELT, THEODORE |
| ELLSWORTH, DUNCAN S. | SARGENT, HOMER E. |
| FAUNTHORPE, J. C. | SMITH, MRS. GEORGE T. |
| FIELD, MRS. EVELYN | STRAWN, SILAS H. |
| FIELD, MRS. STANLEY | STRONG, WALTER A. |
| INSULL, SAMUEL | VERNAY, ARTHUR S. |
| KENNEDY, VERNON SHAW | WHITE, HAROLD A. |
| | WHITE, HOWARD J. |

CORPORATE MEMBERS

ARMOUR, ALLISON V.

BORDEN, JOHN

BORLAND, MRS. JOHN JAY

BYRAM, HARRY E.

CHADBOURNE, MRS. EMILY CRANE

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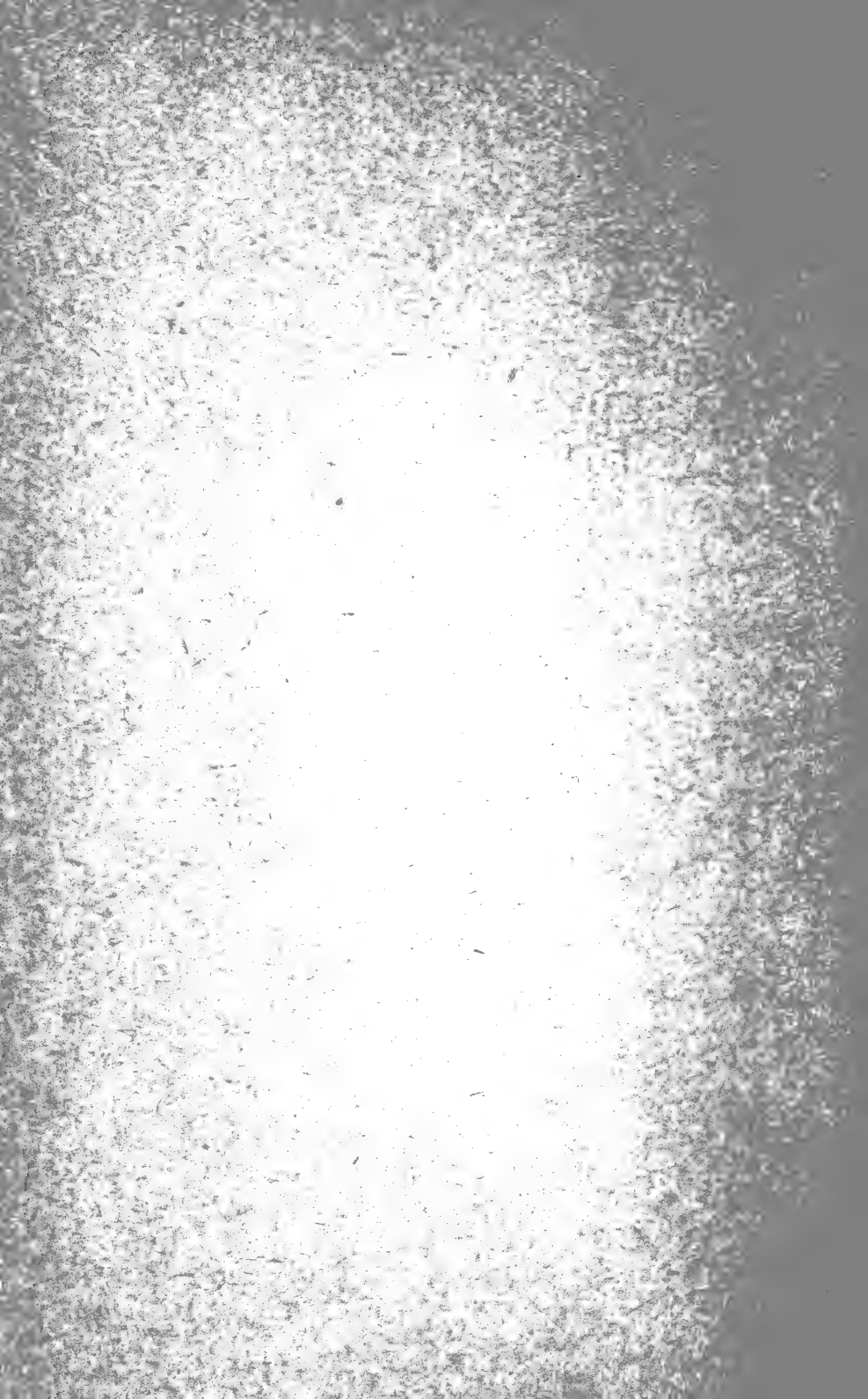
TO THE
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FOR THE YEAR 1930



CHICAGO, U. S. A.

January, 1931





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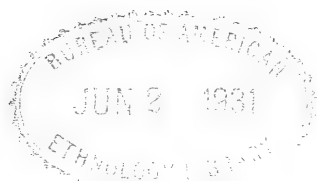
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FOR THE YEAR 1930



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January, 1931

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ANNUAL REPORT OF THE DIRECTOR

1930

To the Trustees of Field Museum of Natural History:

I have the honor to present a report of the operations of the Museum for the year ending December 31, 1930.

In reviewing the achievements of the Museum during the past twelve months it is most gratifying to record once again not only an impressive increase in the number of visitors to the institution, but also a marked rise in the rate of increase. The total number of visitors during 1930 was 1,332,799, or 164,369 more than in 1929, which, with a record of 1,168,430, had the largest attendance of any previous year. This gain over 1929 is more than 14 per cent. The year 1930 was the fourth consecutive year in which the number of visitors has exceeded one million. How the rate of increase is rising is shown by comparing the gain of 144,803 made in 1929 over the 1928 attendance, with the 164,369 gained in 1930 over 1929.

It is of interest to note that of the total number of visitors during 1930 only 160,924 paid admission. Attendance on free days totaled 1,079,367, while free admissions on pay days due to the special privileges granted Members, children, teachers, etc., numbered 92,508. Of the total number of visitors it seems safe to estimate that fully one-third were children.

That the Museum is successfully fulfilling its mission, not only as a place of immense interest for casual visitors, but also as an active and important educational institution of great and increasing scope and influence is indicated by statistics (to be found elsewhere in this Report) on the work carried on through the extra-mural activities conducted by the Department of the N. W. Harris Public School Extension, and the James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures. Through these two units of the Museum organization, Field Museum's benefits were extended outside the walls of the building to approximately 716,000 school children. Thus, adding to this the number of persons actually coming to the Museum, the educational influence of the institution, including both inside and outside work, reached directly more than 2,048,000 individuals.

In recognition of eminent services rendered to Science, the Board of Trustees in 1930 elected Mrs. E. Marshall Field and Mr. Arthur S. Vernay as Honorary Members of the Museum.

In recognition of his eminent services to the Museum, Mr. Philip M. Chancellor was elected as a Patron of the Museum.

The By-Laws of the Museum have been amended for the purpose of adding two new classes of Members, viz.: Corresponding Members and Contributors, and abolishing the membership classification previously designated as Fellow of the Museum. Details concerning the newly created classes of membership will be found in the amended By-Laws included in this Report (p. 453). Corresponding Members are chosen by the Board from among scientists or patrons of science residing in foreign countries who render important services to the Museum. Contributors are all persons giving the Museum from \$1,000 to \$100,000 in money, or in material ranging in value between those amounts.

Three noted foreign scholars who have rendered important services to the Museum were at once unanimously elected as Corresponding Members. They are: Abbé Henri Breuil, professor in the Collège de France, and the Institut de Paleontologie Humaine, Paris; Professor Sir Arthur Keith of the Royal College of Surgeons, London; and Professor Grafton Elliot-Smith of University College, London. These three scientists have rendered especially valuable assistance and advice in the preparatory work being carried on in connection with the proposed Hall of Prehistoric Man and Chauncey Keep Memorial Hall (devoted to physical anthropology), and they also gave counsel on the already completed group of Neanderthal Man on exhibition in Ernest R. Graham Hall.

As a permanent memorial to the persons whose gifts to the Museum place them in the newly created classification of Contributors, an attractive bronze frame was installed in Stanley Field Hall near the main entrance to the building, in which has been posted a list of all persons who have made such contributions. Ninety-seven names now appear on the list in this frame, and provisions have been made for the addition of others as occasion demands. It is only just to mention that there are also thousands of other donors of money and materials in lesser amounts, whose gifts are as fully appreciated. Obviously, it would be impracticable to display a list of all these, because of space limitations. Acknowledgments of all gifts appear each year in the Annual Report of the Director of the Museum (LIST OF ACCESSIONS—p. 424).

Persons who, by their gifts, ranging in value from \$1,000 to \$100,000, made to the Museum during 1930, became Contributors are Mrs. E. Marshall Field, Mrs. William H. Moore, Mrs. Charles

H. Schweppe, Mrs. Louise E. Thorne, Mr. Arthur S. Vernay, Mr. L. M. Willis, and Mr. Lee Ling Yün.

The following were elected in 1930 as Life Members of the Museum: Mrs. Frank H. Armstrong, Mr. Louis E. Asher, Mr. Henry B. Babson, Mr. Thomas M. Boyd, Mr. Herman A. Brassert, Mr. Aldis J. Browne, Mr. George R. Carr, Mrs. Lewis L. Coburn, Mr. William M. Collins, Mr. George A. Cooke, Mr. Charles A. Paesch, and Mrs. A. A. Sprague II.

A list of all classes of Members will be found at the end of this Report (p. 458).

At the Annual Meeting of the Board of Trustees, held in January, Mr. George A. Richardson was elected a Trustee to fill the vacancy caused by the death in 1929 of Mr. Chauncey Keep.

The death of Mr. Charles H. Markham, a member of the Board of Trustees, on November 24, 1930, is regretfully recorded. Mr. Markham had been a Trustee since 1924. He was also a Patron, a Corporate Member and a Life Member. He was sixty-nine years old. In tribute to his memory the Board of Trustees adopted the following resolution:

"It is with deep sorrow and the sense of a great loss that the Board of Trustees of Field Museum of Natural History does hereby record the death of its esteemed member, Charles H. Markham. Mr. Markham became a member of this Board of Trustees in March, 1924, and gave freely and loyally of his counsel and advice at all times up until his recent illness that resulted in his death. Mr. Markham, prior to his acceptance of membership on the Board of Trustees, had already become an outstanding national character in the field of industry and transportation. He was typical of the very finest type of American citizenship, and it is probably conservative to say that he possessed those higher qualities of leadership that made him one of the outstanding business executives of the period in which he lived. He not only directed the policies and managed the affairs of a great railroad system, but he took an active and sincere interest in all matters having to do with the public welfare. It may truly be said that he represented the best of modern leadership in conducting pioneer work looking to the improvement of the relations between the people and public service corporations. His kindly and sympathetic attitude in all matters, his direct, candid and always kindly methods in dealing with others, caused him to be highly respected and affectionately regarded by all whose privilege it was to come within the range of his influence. He was a man of great gentleness

of spirit, and broad human sympathies and deep loyalty to any cause which he espoused. These qualities were always present and never failed to manifest themselves constantly in his attitude toward this institution and his valuable services as one of its Trustees.

"Therefore, be it resolved, that this resolution be made a permanent record of the Board of Trustees of Field Museum of Natural History for the purpose of perpetuating in permanent form, as far as may be, our deep affection, high esteem, and sincere sorrow because of his passing."

An outstanding achievement of the year 1930 was the remarkable progress made in installation of new exhibits, and reinstallation of the older exhibits in many halls. The additions made to the exhibits during the year include many groups which rank among the finest in the Museum, and a great number of objects of most striking character and unusual interest.

A habitat group of the rare giant panda, representing the most notable result of the William V. Kelley-Roosevelts Expedition to Eastern Asia of 1928-29, was completed and placed on exhibition in William V. Kelley Hall. Two of these most unusual animals are shown in their favorite habitat of bamboo thickets in a setting reproducing a scene at a very high altitude in the mountains of western China. One of the animals is the specimen shot by Colonel Theodore Roosevelt and Mr. Kermit Roosevelt, and is the only one ever shot by a white man. The other specimen was obtained by the Roosevelts from native hunters. The group is one of the most beautiful and interesting in the Museum.

After several years of preparation, the first two of the series of habitat groups of marine mammals projected for Hall N on the ground floor of the Museum, have been completed and exposed to the public. The northern sea-lion (or Steller's sea-lion) was selected to occupy the commanding central position in this hall. The group, with thirteen animals, is the largest so far installed in the Museum, and one of the most attractive.

The completion of the sea-lion group was followed almost immediately by a large imposing group of seven Pacific walruses in an adjoining case. They are shown huddled together in characteristic attitude on Arctic ice. In the background is seen the midnight sun, represented by means of a clever lighting arrangement. The whole effect produced is one of exceptional interest. The animals in this group were collected and presented by Messrs. Bruce Thorne of Chicago and George Coe Graves II of New York, as a result of the Thorne-Graves-

Field Museum Arctic Expedition of 1929, which they conducted. Messrs. Thorne and Graves also contributed funds toward the cost of preparing the group. The Museum is indebted also to Mr. Henry Graves, Jr., of New York and to Mrs. Louise E. Thorne of Chicago for substantial contributions toward the cost of preparing the group.

A unique life-size group representing the *Mesohippus*, a species of small three-toed horse which lived in North America millions of years ago, was completed and placed on exhibition in Ernest R. Graham Hall. So far as is known this is the first group restoration ever made of extinct mammals, represented as scientific research indicates they appeared in life, and in the surroundings amid which they lived. Six figures, including full-grown males, mares and young, modeled by Mr. Frederick Blaschke, are in the group, which is a gift from Mr. Ernest R. Graham. The scene is in the Black Hills of South Dakota where these animals are known, from fossil skeletons, to have been fairly common in their day.

An acquisition of great importance was the 745-pound Paragould (Arkansas) meteorite, presented to the Museum by President Stanley Field. This is the largest single meteoric stone ever seen to fall, and is a most valuable addition to the institution's collection of meteorites which, in point of number of falls represented, is the largest collection in the world. The Paragould meteorite has been placed on exhibition in Hall 34.

An exhibit of the rare giant dragon lizard of Komodo, Dutch East Indies, was placed on view in Albert W. Harris Hall. It was prepared from one of the specimens obtained by the Chancellor-Stuart-Field Museum Expedition to the South Pacific (1929-30). This is the largest extant species of lizard, and is found only in the islands of Komodo and Flores of the Lesser Sunda group, east of Java. The exhibit is a reproduction in cellulose-acetate made by Staff Taxidermist Leon L. Walters, by the process he invented and perfected some years ago in the course of his work at the Museum, and which he has successfully applied in creating many exhibits now to be seen in the halls of the institution.

He also prepared an exhibit of the giant prehensile-tailed skink of the Solomon Islands, the original specimen of which was collected by the Cornelius Crane Pacific Expedition of Field Museum in 1929. This is also on view in Albert W. Harris Hall.

Another exhibit prepared during 1930 by this process, is a reproduction of the rare white rhinoceros of Africa, the original specimen

for which was obtained several years ago by the Conover-Everard-Field Museum Expedition to Tanganyika. This is on exhibition in Hall 15.

A mammoth crystal of beryl, weighing approximately 1,000 pounds, discovered in a quarry at Albany, Maine, was presented to the Museum by Mr. William J. Chalmers, and placed on exhibition in Stanley Field Hall.

To the series of American mammal habitat groups in Hall 16 was added a group of marsh deer, largest of all South American deer, in a scene typical of its environment. Five specimens, obtained several years ago by the Marshall Field Brazilian Expedition, are in the group.

An exhibit of unusual interest installed in Hall J is an actual-size representation of a prehistoric burial of Egypt, containing the remains of an Egyptian woman who died some time before 3500 B.C., surrounded by various original artifacts found in such ancient graves. This type of burial preceded the development of mummification and the periods in which elaborate tombs were built.

A remarkably complete and excellent fossil skeleton of an ichthyosaurus or fish-lizard which lived about 150,000,000 years ago, the specimen possessing the unusual feature of including in the slab of stone in which it is imbedded a clear impression of the fins and the skin, was placed on exhibition in Ernest R. Graham Hall.

Seven more of the large mural paintings of prehistoric life being prepared by Mr. Charles R. Knight, for the walls of Ernest R. Graham Hall, were completed and installed during 1930. These bring the total number now on exhibition to twenty-three, and only five more paintings remain to be executed. This notable series is a gift to the Museum from Mr. Ernest R. Graham.

An extraordinary specimen of lodestone, weighing more than 400 pounds, and possessing unusual magnetic power, was placed on exhibition in Clarence Buckingham Hall. Displayed with it are various objects which illustrate its powerful magnetism. The specimen comes from the Wasatch Mountains in Utah.

Reproductions of the two most common ragweeds of the Chicago region, made in the Stanley Field Plant Reproduction Laboratories, were completed and placed on exhibition in the Hall of Plant Life. They are of particular interest to the public because their pollen is held responsible for the widespread affliction of hay fever.

A noteworthy collection of Navaho silver jewelry was placed on exhibition in Hall 6, part of it having been recently acquired as the



TOTEM POLE OF THE HAIDA, QUEEN CHARLOTTE ISLANDS

Set up in two sections on south wall of Hall 10

Total height thirty-seven feet. Presented by Edward E. Ayer, 1902

result of a purchase made with the income of a fund provided by Julius Rosenwald and the late Augusta N. Rosenwald; and part of it consisting of material previously presented by the late Edward E. Ayer.

A number of important additions were made to the Maya archaeological material exhibited in Hall 8. Especially interesting is a model of an ancient Maya pyramid, and casts of several notable Maya door lintels and other objects. In the same hall was also installed a model of the famous Mitla temple of the Zapotecs.

Reinstallations on a large scale were carried on in the exhibition halls of the various Departments, with especially notable changes being made in the Department of Anthropology. The seventy-four cases comprising the Melanesian ethnological collections were transferred from Hall 10 on the first floor to Hall A on the ground floor. The name, Joseph N. Field Hall, which was formerly applied to Hall 10, was transferred to Hall A, because of the association of the man to whom it is a memorial with the collections, he having been the Benefactor who made possible the expedition by which most of the material was obtained. This transfer locates the Melanesian collections where they are adjacent to closely related collections from Polynesia, Micronesia, Malaysia and the Philippines. At the same time it affords a better arrangement on the first floor, making Hall 10 available for North American collections related to the other North, and to the Central and South American collections in the halls adjoining it. Thus, the collections representing the cultures of the Eskimos and of the Indian tribes of the northwest coast were moved from Mary D. Sturges Hall to Hall 10. Because of the larger size of the latter hall, a better geographical arrangement of the exhibits has been made, and the large group cases are shown to better advantage. Also, for the first time since the Museum moved into the present building, it is now possible to display with these exhibits the remarkable series of some thirty large totem poles, grave posts and house posts which has been in the Museum's possession for many years.

The vacated Mary D. Sturges Hall was set aside for the North American archaeological collections, which were removed from the part of James Nelson and Anna Louise Raymond Hall they formerly occupied. These collections are now in process of enlargement, and ample room for the additional material to come is now available in the hall. The removal of archaeological material from James Nelson and Anna Louise Raymond Hall makes possible devoting that hall

entirely to exhibits pertaining to the eastern Woodland Indians, and thus the installation of these collections has been improved. Reinstallation was completed in Raymond Hall of the exhibits representing the Indian tribes of the upper Mississippi valley and the Great Lakes region—the Potawatomi, Sauk, Fox, Menominee, Ojibwa and Winnebago.

Also reinstalled were the exhibits illustrating the lives of the Indians of the Great Plains in Hall 5, and the Mexican and Central American archaeological and ethnological collections in Hall 8. These, and the other reinstallations in halls previously mentioned, include the revision of collections and of information given on the labels, and the substitution of the new style buff labels with black letters for the black labels with silver letters formerly used.

There remains little to be done to complete the reinstallation of Hall J, devoted to Egyptian archaeology. Installation of all the new style individually lighted floor cases in this hall was completed in 1930, and, as recorded in the Annual Report for the preceding year, the majority of the built-in wall cases and other exhibits were installed in 1929. There now are but three more wall cases to be installed, one to be devoted to Coptic textiles, and two to sculptures, and it is expected that this work will be completed early in 1931.

The hippopotamus exhibit, which for nearly three years was on view in Stanley Field Hall, was transferred in 1930 to Hall 15, devoted to the systematic collections of mammals.

Various built-in cases in several halls which have been prepared for proposed habitat groups, were placarded with printed labels giving information as to what they would contain in the future.

Structural work on the cases for large groups, eight in number, in the Hall of Prehistoric Man, was started late in the year. The exhibits in this hall, when completed, will illustrate man's progress from earliest prehistoric times down to the dawn of history, or about 10,000 B.C. This will be done by means of eight life-size groups showing early races of people and their manner of living, and by comprehensive collections of artifacts from various periods. The beginnings of family life, of art, of the domestication of animals, of agriculture and of primitive industry are among the subjects which will be illustrated. Mr. Frederick Blaschke, sculptor, has been engaged to prepare these groups. He reports that two of them are well under way.

In Chauncey Keep Memorial Hall, which is to be devoted to physical anthropology, there will be exhibited twenty-seven full

length life-size figures in bronze, three of which will compose a group symbolizing "Unity of Mankind." The other twenty-four bronze figures will illustrate the physical characteristics of the principal living races of man, showing stature, facial and bodily differences, and other distinctive features. There will also be exhibited sixty heads and twenty-seven life-size busts of typical human beings, modeled in composition material, representing various racial strains of Africa, Europe, Asia, Oceania, North, Central and South America. Other exhibits will illustrate such subjects as intentional facial and bodily deformation as practiced by various primitive tribes; physiologically abnormal types; social anthropology comprising studies of vital statistics, multiple births, influence of racial inter-marriage, growth of population, effects of epidemics and disease on population, and longevity of different races.

The exhibits for this hall will be financed in part by a bequest of \$50,000 left to the Museum by the late Mr. Chauncey Keep, who for fifteen years was a Trustee of the institution, and by a gift of \$18,000 from Mrs. Charles H. Schweppe. Funds to cover the balance have been pledged by Mr. Marshall Field in token of his esteem for Mr. Keep, in whose honor the hall was named.

The figures, busts and heads will be made by Miss Malvina Hoffman. In connection with this task she will make an extensive study of the various races, work from living models and in conformity with scientific data, and will consult with leading anthropologists throughout the world.

Including parties engaged in local field work in near-by collecting grounds, the Museum had seventeen expeditions in operation during 1930. In addition to these, the Museum benefited from a private game hunting trip undertaken in Africa by Mr. Marshall Field; and from the activities of Miss Malvina Hoffman, the sculptress commissioned to prepare series of full-length life-size figures, face masks and busts illustrating the races of the world for Chauncey Keep Memorial Hall, who is making studies in Europe in connection with this work. Of the seventeen expeditions, eleven were in foreign countries, four were close to Chicago in Illinois and Indiana, and two in Colorado. Full details concerning the work performed and the personnel on all the expeditions will be found in the section of this Report under the heading EXPEDITIONS AND RESEARCH, beginning on page 316. The following is a brief summary of some of the most important operations:

Mr. Arthur S. Vernay of New York and London was the sponsor and co-leader of a very important zoological expedition—the Vernay-Lang Kalahari Expedition for Field Museum. Associated with him in the leadership was Mr. Herbert Lang, formerly of New York. The territory in which this expedition worked was the Kalahari Desert and along the Botletle River in the British protectorate of Bechuanaland. It returned late in the year bringing collections remarkable for their size, variety and value. Its record of achievement places it among the most successful expeditions ever sent to Africa. (Route of expedition shown on map facing p. 348.)

The Field Museum Archaeological Expedition to the Southwest began important excavations on the Lowry ruin in southwestern Colorado, and the making of archaeological collections representing Indians believed to have lived 1,500 years ago and more. The most important accomplishment during the 1930 season was the excavation of an ancient kiva or ceremonial chamber, and eleven other large rooms of the ruins. The expedition was financed with income from a fund established by Mr. Julius Rosenwald and the late Mrs. Augusta N. Rosenwald. Dr. Paul S. Martin, Assistant Curator of North American Archaeology, conducted the expedition.

The Chancellor-Stuart-Field Museum Expedition to the South Pacific, which began work in 1929, returned early in 1930. It was led by Mr. Philip M. Chancellor, its sponsor, and Mr. Norton Stuart, both of Santa Barbara, California. Important acquisitions obtained by this expedition include two excellent specimens of the reticulated python of Borneo, which is the largest reptile known to science, and two specimens of the rare giant dragon lizards of Komodo.

Shortly after his return from the above-mentioned expedition, Mr. Chancellor organized the Chancellor-Stuart-Field Museum Expedition to Aitutaki and departed for the Cook Islands. Aitutaki is one of the most remote and least known islands of the Pacific Ocean. The expedition remained in this field for several months. When it returned it brought some 400 fishes for the Museum collections, and some 14,000 feet of motion picture film showing the life of the natives and undersea scenes.

An expedition sponsored and conducted jointly by Captain Harold A. White of New York and Major John Coats of London, England, which had as its principal object the securing of the beautiful, rare and most elusive African antelope known as the bongo, was able to take five of these greatly desired animals. In addition to these, the first still and motion pictures of the living bongo were



RESTORATION OF A SIGILLARIA, A FOSSIL
TREE-LIKE CLUBMOSS

Reconstructed in the Stanley Field Plant Reproduction Laboratories for a
Carboniferous forest exhibit in Ernest R. Graham Hall (Hall 38)

One-thirtieth natural size

made. Also secured were a fine bull eland and a baby rhinoceros, both greatly needed for a water hole group now in preparation. The expedition is continuing its hunt for other unusual animals.

Mr. C. Suydam Cutting returned recently to New York from a successful zoological expedition for the Museum to Sikkim in India, and along the northern border of Tibet. The expedition was organized and financed by Mr. Cutting. He was accompanied by Mr. Herbert Stevens, of Tring, England, who has remained in the field to continue the work of the expedition.

The Field Museum-Oxford University Joint Expedition to Mesopotamia concluded its eighth season of archaeological excavations at Kish during the early part of 1930, and toward the end of the year began its ninth season, which is continuing into 1931. As in previous years, Field Museum's participation in this expedition is financed by Mr. Marshall Field. Each year this expedition has succeeded in accumulating archaeological collections and data of tremendous importance. Professor Stephen Langdon continued as director of the expedition, and Mr. L. C. Watelin as field director.

The Frederick H. Rawson-Field Museum Ethnological Expedition to West Africa, which began work in 1929, returned to Chicago in 1930 after nearly a year in the field. Work was conducted in two regions—Angola (Portuguese West Africa) and Nigeria (British West Africa). Approximately 2,000 objects representing the tribes of these regions were collected, and a large amount of ethnological data was obtained. Mr. W. D. Hambly, Assistant Curator of African Ethnology, was leader of the expedition.

The Peruvian division of the Marshall Field Botanical Expedition to the Amazon completed in 1930 its work begun the preceding year, and returned. Llewelyn Williams, Assistant in Wood Technology, was in charge. The expedition made large and important collections of woods and other botanical material in the Amazonian forests of Peru, which contain one of the world's richest floras, and have received little attention from botanists because of their inaccessibility.

Operations have been begun in southern China by a Museum expedition, sponsored by Mr. Marshall Field, the immediate object of which is to obtain specimens for use in a habitat group of the rare goat-antelope known as the takin. The expedition is led by Mr. Floyd T. Smith of Long Island, New York, who is the only white man in the party.

Mr. Henry Field, Assistant Curator of Physical Anthropology, who since early in the summer had been gathering material and data

in Europe for use in the projected new Hall of Prehistoric Man and the Hall of Physical Anthropology, completed his work late in the year.

An expedition to Florissant, Colorado, in charge of Mr. Bryan Patterson, Assistant in Paleontology, collected a large variety of fossil insects and plants, and other paleontological material.

The work of photographing type specimens of plants in European herbaria, begun in 1929, was carried on during the past year by Mr. J. Francis Macbride, Assistant Curator of Taxonomy. Up to date approximately 9,000 photographs have been made, chiefly of specimens in the herbaria located in Berlin, Munich and Geneva which kindly gave splendid cooperation. Mr. Macbride will continue this work during part of 1931. The project is being carried out under a generous grant of funds provided for the Museum by the Rockefeller Foundation.

Word was received from Mr. Marshall Field that he had shot, on Serengette Plains, Tanganyika Territory, British East Africa, a large male lion, a lioness, and two cubs, which he plans to present to the Museum. It is expected these will be received in the early part of 1931. They will fill a long-felt need for a habitat group of lions to be added to the exhibits in Carl E. Akeley Memorial Hall. While the lion is perhaps the most characteristic and well-known of African animals, the Museum has up to date lacked any satisfactory typical habitat group of them to match the habitat groups of other animals, and the present specimens are arriving at a most opportune time for the creation of an exhibit of this kind.

Miss Malvina Hoffman reports most satisfactory progress on the work she has been commissioned to perform for the Museum. She has spent a large part of the past year in Europe in consultation with leading anthropologists, and in independent research in connection with her task of preparing the figures, busts and face masks by which the races of the world will be represented in the projected Chauncey Keep Memorial Hall. Two of the figures for the hall have already been completed by Miss Hoffman.

Further zoological specimens were received as a result of the Central Asiatic Expedition of the American Museum of Natural History, in which Field Museum cooperated. Dr. Roy Chapman Andrews is leader of the expedition.

The Museum's unprovided for operating deficit for the year 1930 was \$114,898.71 after all contributions.

Many benefactions, in both money and material, were received by the Museum during the year, for which expressions of thanks are herewith renewed. Acknowledgments of contributions of funds follow:

As noted in the Report for 1929, the late Mr. Chauncey Keep provided in his will a legacy of \$50,000 for Field Museum. This amount was received in 1930 from the estate of Mr. Keep, and will be devoted to the preparation of a memorial hall bearing his name.

There was further received from the Estate of Chauncey Keep payment of \$10,600, the amount due on Mr. Keep's pledge to the Yale University Press Film Service, Inc., for remaking for Field Museum fifty-three films of the "Chronicles of America" series. The Museum now possesses forty-seven of these films.

An offer was made by Mrs. Charles H. Schweppe to contribute \$18,000 for a group in Chauncey Keep Memorial Hall. The offer was accepted, and the money will be applied to preparation of the "Unity of Man" bronze group planned for this hall.

Mr. Marshall Field contributed \$46,000 toward the cost of Chauncey Keep Memorial Hall.

A contribution of \$150,000 was also received from Mr. Marshall Field, for use in meeting part of the operating expenses of the Museum during 1930.

Mr. Martin A. Ryerson contributed \$10,000 to the Field Museum Employees' Pension Fund.

Mrs. James Nelson Raymond made a further contribution of \$5,000 towards the operating expense of the James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures.

Contributions amounting to \$7,819.25 were made by Mr. R. T. Crane, Jr. Of these, \$2,000 was for the purchase of jade specimens, \$390 for a notable brown-pink tourmaline now on exhibition in H. N. Higinbotham Hall, and the balance of \$5,429.25 for the purchase of a rare specimen of rose topaz and another of black opal which will be added to the gem collections in 1931.

Mr. C. Suydam Cutting, in addition to financing a zoological expedition to Sikkim, India, made a contribution of \$10,762.50 to cover the cost of publication of a portfolio of colored reproductions of a selected number of paintings of birds and mammals made by the late Louis Agassiz Fuertes while a member of the Field Museum—*Chicago Daily News* Abyssinian Expedition in 1926-27.

Mrs. William H. Moore contributed \$5,000 for the purchase of three exquisite pieces of jade for addition to the Museum's collection.

President Stanley Field contributed a total of \$154,547.25. This amount represents six different contributions, as follows: \$53,606 towards liquidation of the building fund deficit; \$22,707.25 to meet the unprovided for remainder of the deficit for the year 1929; \$50,000 to cover part of the operating deficit of the Museum for the year 1930; \$15,600 to cover the operating expenses of the Stanley Field Plant Reproduction Laboratories of the Museum during 1930; \$6,434 given to cancel the overdraft of the Field Museum Employees' Pension Fund income account; and \$6,200 for the purchase of the remarkable Paragould meteorite, which is described elsewhere in this Report.

Mr. Albert W. Harris gave \$3,700 for the purchase of a new delivery truck to carry to the schools the exhibition cases circulated by the Department of the N. W. Harris Public School Extension of Field Museum.

Mr. William V. Kelley contributed \$3,000 to meet the expense of gathering data and materials necessary for the completion of certain habitat groups of Asiatic mammals.

A contribution of \$50,000 was received from Mrs. E. Marshall Field to be devoted toward the operating expenses of the Museum during 1930.

From the Rockefeller Foundation there was received a further grant of \$5,000 for continuing the work of photographing type specimens of plants.

Mrs. Louise E. Thorne contributed \$2,000 toward the expense incurred in mounting for exhibition the walrus group now in Hall N, collected by the Thorne-Graves-Field Museum Arctic Expedition of 1929, which was sponsored and led by Messrs. Bruce Thorne and George Coe Graves II. Mr. Henry Graves, Jr., Mr. George Coe Graves II, and Mr. Bruce Thorne also each contributed \$1,000 toward the preparation of this group.

Mr. William J. Chalmers gave \$834.85 for the purchase of specimens for addition to the William J. Chalmers Crystal Collection in Hall 34.

From the American Friends of China there was received \$655, for the purchase of material for addition to the Chinese collections, details of which are given elsewhere herein.

The South Park Commissioners turned over to the Museum \$205,911.15 representing the amount due the Museum under the tax levy authorized for this purpose by the state legislature. Of

this amount \$150,000 was used to retire the tax anticipation warrants issued by the South Park Commissioners. The balance of \$55,911.15 was in cash payments made in the usual way.

As in the past the Museum during 1930 was the recipient of gifts of material for the collections of the various Departments. Such gifts are deeply appreciated, not only because of the value they add to the collections, but also for the active interest which they indicate is being taken in the growth and development of the Museum by its friends. Details of the acquisitions of the year are given in the departmental sections of this Report, and in the LIST OF ACCESSIONS beginning on page 424.

Among noteworthy gifts were a 745-pound stone meteorite, presented by President Stanley Field; a crystal of beryl weighing nearly 1,000 pounds, the gift of Mr. William J. Chalmers; a cut, brown-pink gem tourmaline weighing fifty-eight carats presented by Mr. R. T. Crane, Jr.; six old and valuable Navaho Indian blankets given by Mr. Burrige D. Butler of Chicago; a beautiful Pompeian glass amphora and its original bronze holder presented by Mr. L. M. Willis of Chicago; a rare old Chinese painting, a carved rhinoceros horn, a prehistoric pottery jar, a gilt bronzine, and a white porcelain jar, all from China, purchased with funds provided by the American Friends of China, Chicago; three outstanding jade objects presented by Mrs. William H. Moore of New York; five important objects of Chinese jade acquired through the generosity of Mr. R. T. Crane, Jr.; a translucent jade dish given by Mrs. George T. Smith of Chicago; a plastron of a turtle inscribed in Chinese characters of about 1500 B.C., which is of great scientific interest, presented by Mr. A. W. Bahr of New York; a Chinese metal mirror of high artistic quality given by Mrs. Charles H. Schweppe of Chicago, and two mortuary clay figures of horsewomen playing polo presented by Mr. David Weber of Chicago. In addition to the above, noteworthy collections and specimens were received as gifts from many other individuals and institutions, among whom are the following: Mr. C. F. Buhmann, Davenport, Iowa; Rev. H. A. Cotton, Warrensburg, Illinois; Dr. I. W. Drummond, New York; Mr. William B. Greenlee, Chicago; Dr. Martin Gusinde, Vienna, Austria; Haskell Museum, Oriental Institute, University of Chicago; Mr. N. M. Heeramaneck, New York; Mr. Thomas S. Hughes, Chicago; Professor Stephen Langdon, Oxford, England; Mr. Lee Ling Yün, Shanghai, China; Museum of Science and Industrial Arts, Chicago; Mr. Henry J. Patten, Chicago; Professor Samuel J. Record, New Haven, Connecticut; Mr. J. A.

Skelton, Sonsonate, Salvador; Mr. Frank von Drasek, Cicero, Illinois; Mr. Sidney Weiss, Chicago; Dr. Ralph M. Whitehead, New York; British Museum (Natural History), London; Bureau of Science, Manila, Philippine Islands; Dr. Will J. Cameron, Chicago; Miss Emily A. Clark, Chicago; Mr. Henry Field, Chicago; General Biological Supply House, Chicago; Illinois Humane Society, Chicago; Dr. A. C. Kinsey, Bloomington, Indiana; Mr. Fred Lew, Stadra, California; Lincoln Park Aquarium, Chicago; Mr. Honore Palmer, Chicago; Mr. John Wentworth, Chicago; Dr. Alfred S. Romer, Chicago; John G. Shedd Aquarium, Chicago; the Hon. Dilipat Singh, Singahi, Oudh, India; Professor J. K. Strecker, Waco, Texas; United States Bureau of Fisheries, Washington, D.C.; Mr. H. C. Benke, Chicago; Mrs. Leonora S. Curtin, Santa Fe, New Mexico; Dirección General de Agricultura, Guatemala City, Guatemala; Mr. G. L. Fisher, Houston, Texas; Professor A. O. Garrett, Salt Lake City, Utah; Hercules Powder Company, Wilmington, Delaware; Professor L. A. Kenoyer, Kalamazoo, Michigan; Mr. C. L. Lundell, Dallas, Texas; Yale University, School of Forestry, New Haven, Connecticut; Mr. Franklin Hardinge, Chicago; Mr. H. H. Nininger, Palmer Lake, Colorado; Mr. William B. Pitts, Sunnyvale, California; Standard Oil Company (Indiana), Chicago; Sullivan Machinery Company, Denver, Colorado; Estate of John Telling, Chicago; United Fruit Company, Boston, Massachusetts; Compton and Company, Chicago; Paramount News Films, Chicago; Spoor and Abbe Film Corporation, Chicago; Captain Harold A. White, New York, and United States Steel Corporation, New York. These are but a few of the many contributors. A complete list of them and their gifts appears in the LIST OF ACCESSIONS beginning on page 424, and detailed descriptions of the various gifts appear in the section of this Report under the heading ACCESSIONS, beginning on page 354.

Other noteworthy additions to the collections were acquired through Museum expeditions, purchases, and through exchange with other institutions. Details of these will be found in the section of this Report relating to ACCESSIONS (p. 354), and they are listed in the LIST OF ACCESSIONS (p. 424). Among the most notable of these are more than 200 objects obtained on the Field Museum Archaeological Expedition to the Southwest, and a collection of Navaho Indian jewelry which was purchased.

A contribution of \$300 was made by the Museum as an annual payment to the Institute for Research in Tropical America, located on Barro Colorado Island, Gatun Lake, Canal Zone, Panama.

All Departments and Divisions of the Museum show satisfactory progress in their work during the year. In addition to the activities already described in the foregoing pages, much has been accomplished in such branches as improvement and enlargement of the special collections and facilities for study purposes; in cataloguing, inventorying and labeling thousands of specimens; and in conducting scientific research into a host of subjects. As usual, there has been much public service rendered in the form of answering many inquiries made daily by persons in need of information upon a wide variety of subjects within the scope of the institution. Details of these various types of activity appear elsewhere in this Report.

The annual spring and summer courses of free illustrated lectures on science and travel were given for the general public in the James Simpson Theatre of the Museum, and also a series of special lectures for Members of the Museum. Response to these offerings was gratifying, as may be seen in the statement of the attendance they attracted, given on page 303.

With an increased number of schools on its list to receive service, and an increase in the number of traveling exhibition cases in circulation, the Department of the N. W. Harris Public School Extension carried on its work of supplementing, by visual education methods, the studies presented in the regular curriculum of the city schools. A full account of this Department's activities appears on page 411.

The varied activities of the James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures reached the greatest number of children on record for any year thus far in the history of this division of the Museum. As in previous years, these activities included the sending of extension lecturers with lantern slides to the schools; the presentation of spring, summer and autumn series of free motion pictures and other forms of educational entertainments in the James Simpson Theatre; tours of the Museum exhibits for groups of visiting children; and other types of work which are treated at length in this Report, beginning on page 304.

For adults, guide-lecture tours were continued as in past years on a schedule of two tours daily except Saturdays and Sundays. A wide variety of subjects was covered, and gratifying public interest was evinced in the opportunity presented by these tours. In addition to the regular public tours of this type, special guide-lecture service for groups requesting it was made available, as has been the practice in the past.

Many large groups of visitors from downstate Illinois were brought to the Museum under the auspices of the Chicago Entertainment Committee, as a feature of its educational tours of the city. Groups included both school children and adults, and were formed in cities, towns, villages and rural districts. Kiwanis, Lions, Rotary and similar clubs and civic organizations in the various places cooperated in organizing the parties, and the railroads extended special low rates.

A series of six radio lectures on exploration and the results of scientific research was given by the Director and other members of the scientific staff over broadcasting station WLS (*The Prairie Farmer* station). Other contacts with the public were made by means of the radio at various times during the year.

The Library of the Museum, in addition to its constant service as a source of information to assist the scientific staff, also served many visitors from outside. These were largely students from universities in and about Chicago. The Library was of service also to a number of authors, editors, manufacturers' representatives seeking data, teachers, persons engaged in scientific work, and other persons in need of information on subjects within the scope of the 92,500 books and pamphlets on its shelves.

Students, persons engaged in research, and others obtained valuable service from the collections of study material maintained in the various Departments of the Museum.

Such Divisions of the Museum as Public Relations, Publications, Memberships, Printing, Roentgenology, Photography, and Illustration all accomplished important work during the year, of which detailed accounts will be found in various sections of this Report.

Scientific publications, popular leaflets, and other printed matter of the Museum continued to be issued on a large scale. In addition to continuing the usual series, the Museum published *Flora of the Indiana Dunes*, a pocket-size handbook of special value to all nature lovers in the Chicago region, and the portfolio of beautiful colored reproductions of paintings of birds and mammals by the late Louis Agassiz Fuertes, member of the Field Museum—*Chicago Daily News* Abyssinian Expedition. The latter was made possible by the contribution, elsewhere mentioned, of Mr. C. Suydam Cutting.

Great progress was made in the development of electrical and chemical treatments to remove malignant patina from ancient bronzes, under the supervision of Mr. Henry W. Nichols, Associate Curator of Geology. A publication setting forth these methods of



MURAL PAINTING, RESTORATION OF UPPER MIOCENE MAMMALS OF NORTH AMERICA

Ernest R. Graham Hall (Hall 38)

Gift of Ernest R. Graham. Painted by Charles R. Knight

treatment, prepared by Mr. Nichols, was issued in the Museum's Technique Series.

A monthly bulletin, *Field Museum News*, was inaugurated at the beginning of the year. This bulletin is sent to all Members of the Museum to keep them in close touch with the activities of the institution. Many pictures of new exhibits, as well as news reports and announcements, are published in it. A more detailed account of this undertaking, as well as a summary of the general publicity obtained for the Museum in newspapers and periodicals and the advertising carried on through various media generously placed at the disposal of the Museum, will be found in this Report under the heading DIVISION OF PUBLIC RELATIONS (p. 413).

Since the spring of 1930 transportation facilities for reaching the Museum have been greatly improved, due to the inauguration of bus service direct to the doors of the institution by the Chicago Motor Coach Company's Jackson Boulevard (No. 26) line, with transfer privileges between this and all connecting lines of the company.

The University of Chicago, at its convocation in December, conferred upon President Stanley Field an honorary degree of Doctor of Laws, in recognition of the great public service he has rendered through his work and his benefactions as a Trustee, and as President of the Museum.

Dr. Wilfred H. Osgood, Curator of the Department of Zoology, spent three months in London studying type specimens of mammals in the British Museum (Natural History) for the purpose of comparison with specimens obtained by the William V. Kelley-Roosevelts Expedition to Eastern Asia.

Dr. C. E. Hellmayr, Associate Curator of Birds, spent several months in Europe on an ornithological research mission for Field Museum. He took with him a number of rare bird specimens collected by the Cornelius Crane Pacific Expedition, the Marshall Field South American Expedition, and others, for comparison with type specimens in museums of Great Britain, France, Germany and other countries.

Dr. Hellmayr was awarded the great silver medal of the Société Nationale d'Acclimatation de France, for his meritorious work on South American birds.

Mr. J. Francis Macbride, Assistant Curator of Taxonomy, who has been in Europe since the beginning of the year to obtain photographs of type specimens of tropical American plants under the provisions of the grant of funds made by the Rockefeller Foundation,

was assigned as Field Museum's representative to the section of nomenclature of the International Botanical Congress at Cambridge, England. Mr. Llewelyn Williams, Assistant in Wood Technology, represented the Museum at the Congress' informal conference on woods. Professor Samuel J. Record, the Museum's Research Associate in Wood Technology, attended the Congress as the representative of Yale University, where he is Professor of Forest Products in the School of Forestry.

The cordial relations existing between Field Museum and the Museum of Comparative Zoology of Harvard University were continued and furthered during the year by mutually advantageous exchanges of material and by personal contacts of staff members. Dr. Thomas Barbour, Director of the Museum of Comparative Zoology, spent several days visiting Field Museum in June, and later Dr. Glover M. Allen, Curator of Mammals of the same institution and Associate Professor of Zoology at Harvard University, came to Field Museum for conference with the zoological staff and for the selection of material for exchange. Likewise, Mr. Karl P. Schmidt, Assistant Curator of Reptiles at Field Museum, went to Cambridge for research work on specimens in the Museum of Comparative Zoology and to make preliminary arrangements for exchanges. Further cooperation between the two institutions was carried out by the collaboration of Mr. Outram Bangs, Curator of Birds of the Museum of Comparative Zoology, in the preparation of a report for publication by Field Museum on the collection of birds obtained by the William V. Kelley-Roosevelts Asiatic Expedition.

There were few changes in the Museum staff during the year.

Mr. John T. Zimmer resigned his post as Assistant Curator of Birds, to become Associate Curator of Birds at the American Museum of Natural History, New York.

Miss Elsie Lippincott, Librarian of the Museum for thirty-three years, resigned on account of ill health. Her resignation was accepted with regret, and with full appreciation of the long and faithful service she had rendered. The vacancy was filled by the promotion of Mrs. Emily Wilcoxson, formerly Assistant Librarian. Mrs. Mary W. Baker has been appointed Assistant Librarian.

The services of Dr. T. George Allen of the Oriental Institute, University of Chicago, were re-engaged through 1930 in order to continue the work necessary for the classification and labeling of Egyptian archaeological material.

Mr. Milton Copulos, who was a plant modeler in the Stanley Field Plant Reproduction Laboratories some years ago, returned to this position in 1930. Mr. John H. Wolcott was employed as a preparator in these Laboratories.

Mr. Eugene Leitham was employed as a plant mounter in the Department of Botany.

Mr. Paul Nieh was employed for some months as a preparator in vertebrate paleontology. Following his departure, Mr. J. H. Quinn was employed in this position.

Mr. James Mooney was employed for temporary work in the Division of Fishes during July, August and September. Mr. Dominick Villa has been employed as a skin-dresser in the Department of Zoology. Mr. Pierce Brodkorb was temporarily engaged for work in the Division of Birds during October, November and December. Mr. Herman Hinrichs, assistant in taxidermy, resigned.

The title of Miss Lillian A. Ross, employed as proofreader in the Division of Printing in 1929, was changed to Editor in 1930.

In the Division of Printing the working force was considerably reduced by the resignation of two compositors, one pressman, one monotype operator, and one bindery girl. Of these, it was necessary to replace only the monotype operator. The resignations, with the exception of the bindery girl, represent the workers formerly employed on a temporary night shift, which, with the exception of night work on the monotype machine, has been discontinued because work in the Division has caught up to the point where the regular day shift can handle it adequately.

It is gratifying to report that the Division of Printing has been able to keep pace in label printing not only with the progress of installation, but also to carry on simultaneously the reprinting of a large number of the new style labels for previously installed exhibits.

Three Museum employes died during the year. Mr. Walter H. Beardsley, a preparator in the Department of the N. W. Harris Public School Extension, who had worked for the Museum more than twenty years, died suddenly on June 17. Insurance amounting to \$4,000 under the Field Museum Employees' Pension Fund was paid to his widow. Mr. Charles Kuhn, sergeant of the night guard, died on January 4. At the time of his death he was the oldest in length of service of all employes of the Museum. Under the Museum Employees' Pension Fund his widow was paid \$4,000. Mr. Frank Hubacher, mailing clerk, died on June 9. His widow received \$2,500

under the insurance provided through the Museum Employees' Pension Fund.

The Museum's janitors have been provided with neat washable uniforms. This has resulted in improvement of the appearance of this type of personnel wherever their work brings them into the view of Museum visitors.

The James Simpson Theatre of the Museum was made available to Mrs. Elizabeth Sprague Coolidge for the presentation of a Festival of Chamber Music which she sponsored, consisting of five concerts.

The Chicago Geographic Society in 1930 vacated the large room on the third floor which it had used as an office for several years. This room, No. 4, is now being used for the cryptogamic herbarium and the Illinois herbarium of the Department of Botany.

Proper attention was given during the year to maintenance, and many notable improvements in the physical aspects of the building and its facilities were made. A number of the more important improvements are noted in the following pages.

The old benches, which for years served their purpose both in the former Jackson Park building of the Museum and in Stanley Field Hall since the occupancy of the present structure, have been replaced with fourteen especially constructed massive mahogany benches. These new benches are constructed on extremely comfortable lines, and are very attractive in appearance. Not only do they add to the appearance of Stanley Field Hall, but they afford seating capacity for a greater number of persons.

The program of painting exhibition halls which began in 1929, when fourteen halls were painted, was carried on during 1930, and at the close of the year only a few exhibition halls which have not yet been opened to the public remained to be done. Marked indeed is the betterment in the appearance of the halls which have been painted. Especially impressive is the contrast which may now be observed in Stanley Field Hall as compared with its appearance prior to the undertaking of this extremely extensive painting task. In addition to the painting of exhibition halls done under contract, the Museum's own force of painters completed the painting of thirteen rooms, departmental offices, laboratories, shops and storage rooms on the third and ground floors, as well as the entire fourth floor and attic, and the girders in the latter place.

Two hundred and twenty new glassteel electric lighting fixtures were installed. The lighting fixtures in Ernest R. Graham Hall



GROUP OF SOUTH AMERICAN MARSH DEER

Hall of American Mammal Habitat Groups (Hall 16)

Marshall Field Brazilian Expedition, 1926. Taxidermy by Leon L. Pray. Background by Charles A. Corwin

were replaced with a special indirect lighting fixture. In this hall two large cases were also wired, and experiments were conducted to determine the effects of light boxes over the free-standing cases used for some of the exhibits.

New lighting fixtures were installed in Hall 19, and at the north entrance to the building.

On the ground floor Hall A was rewired, and forty-six glassteel lighting fixtures installed. Subsequently this hall became Joseph N. Field Hall, following the removal into it of the Melanesian collections from Hall 10 on the first floor, which was formerly Joseph N. Field Hall.

As a safeguard for visitors to the Hall of Marine Mammals, opened during 1930 at the time of completion of the new sea-lion and walrus groups, bronze handrails of a pleasing appearance were erected on the stairs leading to the hall.

Fifteen built-in cases for habitat groups of Asiatic mammals were completed in William V. Kelley Hall, and one case, approximately forty-seven feet wide, twenty feet deep, and twenty-two feet high, was constructed for an African water hole group, to be installed in the south end of Carl E. Akeley Memorial Hall. The first built-in case in the new Hall O on the ground floor, which is to be devoted to habitat groups of fishes and systematic fish collections, was completed in preparation for installation of the first habitat group. This case is approximately thirty-seven feet wide and fifteen feet deep. The air duct in the corridor along the cafeteria was rerouted, and the old duct was removed, as was the old pipe over it, in order to make way for this case.

Twenty-four mahogany cases for the systematic collections of birds and mammals were purchased, as were one case for an exhibit of the sago palm, and one for a reproduction of a pineapple plant.

In ten exhibition halls 132 windows were closed with paneling of homasote insulating board on the exterior, and gypsum board for fireproofing on the interior, the latter colored to match the walls.

A contract was entered into with a window cleaning concern to wash periodically all windows. The result of such attention has been to improve decidedly the appearance of the building. The Museum's own maintenance force will continue to carry on the cleaning of windows when conditions require it.

The walls and ceilings of the two public lavatories were covered with chromite, in pleasing colors and designs. The facilities in

these rooms were improved by having the nickel trimmings and fixtures chromium plated, and by replacing all the old flush valves with a more modern type of valves.

In accordance with the Museum's policy to eliminate as far as possible all fire hazards caused by wooden shelving, cabinets, etc., as well as to give better protection to material in storage and to stocks of needed supplies and equipment, seven steel and enameled cupboards were erected in the Division of Photography.

By installation of 220 metal self-closing individual containers, provisions have been made for the safe and efficient filing and handling of the Museum's increasing number of motion picture reels. These containers are assembled in rows, and each container will bear a label telling its contents and other required information. The care and supervision of these reels, as well as of all stereopticon lecture slides, has been assigned to the staff of the James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures.

Much was done in the way of providing improved storage facilities for scientific material. Twenty-four steel storage cabinets with racks and 500 trays were provided for birds and mammals. One block of three steel units fitted with racks and glass-topped drawers was provided for insects. Five blocks of twelve steel units each were installed for storing physical anthropology material. Six blocks of eight units each were added to the Herbarium. Wooden storage racks in the Division of Fishes were replaced with 4,300 square feet of enameled steel shelving. Likewise, wooden racks in eight storage rooms of the Department of Anthropology were replaced with 13,200 square feet of enameled steel shelving, thus increasing storage capacity one-third.

Room 55 on the third floor was converted from a storage room for ethnological material into a light, attractive room for the use of students desiring to use the anthropological study collections.

The skin storage rooms were equipped with pipe hangers. Light and motor power lines were installed for the skin treatment room. Lights were provided for the bone storage cabinets on the fourth floor. Lights were installed also over the stacks in Room 81, containing the office and storage space of the Division of Fishes, and Room 77, storage room of the Division of Mammals.

One new leathering tub and one dusting cage have been added to the equipment of the taxidermy shop.

In the skylight over Stanley Field Hall the gutter drains were changed to one and one-half inch galvanized pipe to facilitate the

drainage of water collecting there due to condensation, and fourteen fan-heating units were installed to heat the glass of the skylight to prevent condensation. To prevent any damage to the ceiling of Stanley Field Hall in case of condensation or leakage of the main skylight, the entire structural tile surfaces were given a coat of cement plaster, and two coats of waterproof paint, and all exposed steel trusses were given one coat of paint.

The large skylights in the studio of the Division of Photography, and the artists' room of the Department of Botany, were rebuilt with nonpareil bars and ribbed wired glass. Four smaller skylights in the taxidermy shop were likewise rebuilt. This change resulted in the elimination of dripping of water caused by condensation, and also produced a decided improvement in lighting conditions, so important for the special types of work carried on in these rooms.

The tuck pointing of all exterior walls, cornices, and parapet walls, started in 1928 and carried on in 1929, was continued in 1930, and the entire exterior of the building was completed with the exception of the north and south steps.

Work was begun to provide protection against water seepage under the steps at the north and south entrances of the building. To protect the steel girders the tile work encasing the girders had to be removed, and as the tiles performed a structural function they had to be replaced by small I-beams. For waterproofing on the outside the marble joints were cut to a sufficient width to allow an adequate cement-mortar joint to be made, and this was capped with a mastic cap. This work was started late in October and was still in progress at the end of the year.

Due to the ravages of the weather it was necessary to replace the canvas canopy leading to the west door with a new one.

Settling of the ground at the west entrance of the Museum made it necessary to re-lay the cement sidewalk approach.

An emergency water line was installed from the Museum's pumps through the tunnel leading to Soldier Field.

All boiler settings were repaired, and two new arches were installed over the furnaces.

Steam for heating was furnished to the Shedd Aquarium, the supply being governed by weather conditions. During the winter months twenty-four hour service was maintained. Steam was also furnished to the building on Soldier Field from November 26 to December 5.

LECTURES AND ENTERTAINMENTS

GENERAL LECTURES.—The Museum's fifty-third and fifty-fourth courses of free lectures for the public were given in the James Simpson Theatre on Saturday afternoons during the spring and autumn months. They were illustrated by motion pictures and stereopticon slides. Following are the programs of both courses:

FIFTY-THIRD FREE LECTURE COURSE

- March 1—Australian Aborigines.
Captain Kilroy Harris, D.S.O., F.R.G.S., Cleveland, Ohio.
- March 8—Bali, Borneo and Sumatra.
Mr. H. C. Ostrander, Yonkers, New York.
- March 15—Himalayan Exploration.
Captain John B. Noel, London, England.
- March 22—Afghanistan.
Mr. Jackson Fleming, New York.
- March 29—To New Guinea for Living Birds of Paradise.
Mr. Lee Crandall, Curator of the New York Zoological Park.
- April 5—Bird Enchantment.
Mr. T. Walter Weiseman, Lakewood, Ohio.
- April 12—The Wonderland of Plants.
Mr. A. C. Pillsbury, Berkeley, California.
- April 19—A Naturalist in the South Seas.
Mr. Karl P. Schmidt, Assistant Curator of Reptiles, Field Museum; leader of the scientific section of the Cornelius Crane Pacific Expedition of Field Museum, 1928–29.
- April 26—Indian Cultures of the Southwest.
Dr. Paul S. Martin, Assistant Curator of North American Archaeology, Field Museum.

FIFTY-FOURTH FREE LECTURE COURSE

- October 4—Picturesque Japan.
Mr. Horace E. Coleman, Chicago (a resident of Japan for more than twenty years).
- October 11—Primitive Tribes of Angola, Portuguese West Africa.
Mr. Wilfrid D. Hambly, Assistant Curator of African Ethnology, Field Museum; leader of the Frederick H. Rawson-Field Museum Ethnological Expedition to West Africa, 1929–30.
- October 18—Botanical Collecting along the Upper Amazon.
Mr. Llewelyn Williams, Assistant in Wood Technology, Field Museum; leader of the Marshall Field Botanical Expedition to Peru, 1929–30.
- October 25—Madagascar and Her People.
Dr. Ralph Linton, Professor of Anthropology, University of Wisconsin (leader of the Marshall Field Ethnological Expedition to Madagascar for Field Museum, 1925–27).

- November 1—On Horseback to the Glacial Age.
Mr. Walter L. Payne, Department of Public Instruction, Bureau of Commercial Economics, Washington, D.C.
- November 8—Archaeological Explorations in the Maya Field and a Description of the Aztec and Maya Hieroglyphic Writings.
Dr. Sylvanus G. Morley, Carnegie Institution of Washington, D.C.
- November 15—Will Insects Displace Man?
Mr. Brayton Eddy, Providence, Rhode Island.
- November 22—Siam and Indo-China.
Mr. H. C. Ostrander, Yonkers, New York.
- November 29—With Pinchot in the South Seas.
Mr. Howard Cleaves, Pinchot South Sea Expedition, 1929.

The total attendance at these eighteen lectures was 22,186.

In addition to the regular spring and autumn courses, the following special lectures were given for Members of Field Museum:

- January 12—The Rainbow Isles of the Guinea Gulf.
Mr. T. Alexander Barns, London, England.
- January 19—Shrinkers of Human Heads.
Dr. Herbert Spencer Dickey, New York.
- January 26—Through Southern Abyssinia.
Mr. C. J. Albrecht, Department of Zoology, Field Museum; member of the Harold White-John Coats-Field Museum Expedition to Southern Abyssinia.
- February 9—Sea Hawks.
Captain C. W. R. Knight, London, England.
- November 16—Primitive Tribes of Angola, Portuguese West Africa.
Mr. Wilfrid D. Hambly, Assistant Curator of African Ethnology, Field Museum; leader of the Frederick H. Rawson-Field Museum Ethnological Expedition to West Africa.
(Note: Delivered by Mr. J. Eric Thompson for Mr. Hambly.)
- November 23—Hunting Tigers and Other Mammals in India.
Mr. Arthur S. Vernay, New York.
- November 30—With Pinchot in the South Seas.
Mr. Howard Cleaves, Pinchot South Sea Expedition, 1929.
- December 7—Amazonian Jungles and Andean Trails.
Mr. Llewelyn Williams, Assistant in Wood Technology, Field Museum; leader of the Marshall Field Botanical Expedition to Peru, 1929-30.
- December 14—Excavation in a Prehistoric Village in Colorado.
Dr. Paul S. Martin, Assistant Curator of North American Archaeology, Field Museum; leader of the Field Museum Archaeological Expedition to the Southwest, 1930.

The total attendance at these nine special lectures was 5,417.

The total number of lectures for adults was twenty-seven, and the total attendance at them was 27,603.

JAMES NELSON AND ANNA LOUISE RAYMOND
FOUNDATION FOR PUBLIC SCHOOL AND
CHILDREN'S LECTURES

By action of the Board of Trustees of the Museum, the name of the division formerly known as the James Nelson and Anna Louise Raymond Public School and Children's Lecture Division was changed in 1930 to that designated above.

ENTERTAINMENTS FOR CHILDREN.—The James Nelson and Anna Louise Raymond Foundation has continued to provide both lecture and entertainment programs for children. These programs have been presented in the Museum, and also outside in schools and camps.

Three series of entertainments were offered during the year. As in the past, the spring and autumn courses were given on Saturdays in the James Simpson Theatre, and the summer series, offered on Thursdays during July and August, was given in the exhibition halls and in the Theatre. Following are the programs of these three series of entertainments:

SPRING COURSE

- February 22—Washington's Birthday.
Gateway to the West.*
Yorktown.*
- March 1—Across St. Gothard's Alps.
A Fossil Cycad.
Making Cement.
Fish and Fowls.
Hunting Wild Animals in India.
- March 8—Glimpses of Japan.
Japanese Scenery.
Rice Growing and Wrestlers.
Silk Industry.
Boys and Girls.
Old Moose Trails.
- March 15—The Doings of "Turp" and "Tine."
Strip Mining.
20,000 Leagues under the Sea.
Among the Naskapi Indians.
- March 22—Transportation through the Ages.
Bedouins of the Sahara.
Jewels of Industry.
Whistling Swans.
- March 29—Story of Paper and Printing.
Romance of Rayon.
The Rook.

- A p r i l 5—Persimmons in China.
Magic Yellowstone.
Knights of the Air.
The Ant.
Our Spring Birds.
- A p r i l 12—The Potter's Wheel.
Wizardry of Wireless.
The Butterfly.
Our Spring Wild Flowers.
- A p r i l 19—Getting Canada's Goat.
Edison, the Wizard.
Lions and Other African Animals.
- A p r i l 26—Daniel Boone.*
The Grand Canyon.
Adopting a Bear Cub.

*Gift to the Museum from the late Mr. Chauncey Keep.

The total attendance at these ten entertainments was 15,058.

AUTUMN COURSE

- October 4—Friend Snail.
Drifting Dunes.
The Silver Swimmer.
Undersea Life.
Nesting of the Sea Turtle.
- October 11—Columbus.*
Lions on the Rocks.
- October 18—The Story of Petroleum.
(Lecture illustrated with motion pictures.)
Musquash, the Muskrat.
- October 25—Hungarian Farmers.
Our Daily Bread.
The Coon Hunt.
- November 1—In Mexico.
Enamelware.
The Last of the Seminoles.
A Four-footed Columbus.
- November 8—Trees to *Tribunes*.
The Last Stand of the Red Man.
Sacred Baboons.
- November 15—How a Volcano Works.
Active Volcano in Hawaii.
Aloha Land.
The Cobra and the Mongoose.
Strange Animal Habits.
- November 22—Beautiful Corsica.
A Persian Wedding.
Egypt, Old and New.
The Taj Mahal.
- November 29—The Puritans.*
Peter Stuyvesant.*

December 6—On the Trail of the Dik Dik.
The Stork.
Castles of Paper.
Winter Pep.

*Gift to the Museum from the late Mr. Chauncey Keep.

The total attendance at the ten fall entertainments was 15,020.

The summer course was planned to help meet the needs of children for wholesome entertainments during the summer vacation, and consisted of special tours of the exhibition halls, and motion pictures and story-hours in the James Simpson Theatre. The programs were as follows:

J u l y 10—Tour: Animal Life of Plains and Deserts.
Motion Picture:
Chang.

J u l y 17—Story-hour: A Day in Japan.
Tour: The Japanese Hall.

J u l y 24—Tour: The Insect Laboratory.
Motion Pictures:
Six-legged Friends.
Cabbage Butterflies.
Singing and Stinging.
Honey Makers.
Baby Songbirds at Mealtime.

J u l y 31—Tour: Halls Illustrating Life in the South Seas.
Motion Picture:
Bali, the Unknown.

A u g u s t 7—Story-hour: A Trip to Eskimo Land.
Tour: The Eskimo Hall.

A u g u s t 14—Tour: Plants and Animals Used by the Pioneers.
Motion Pictures:
Vincennes.*
The Frontier Woman.*

*Gift to the Museum from the late Mr. Chauncey Keep.

The total number of groups handled during this summer course was thirty-six and the attendance was 8,528. Of this number 3,198 represents the tour attendance, and 5,330 the theatre attendance.

Three special programs were given during the winter:

J a n u a r y 18—Story-hour: Bobbie Robin.
Motion Pictures:
The Ladybird.
Peter, the Raven.

J a n u a r y 25—Story-hour: A Trip to Banana Land.
Motion Pictures:
Banana Land.
Cruising in the Arctic.

February 12—Motion Pictures:

Abraham Lincoln.
My Mother.
My First Jury.
My Native Land.

The total attendance at the special programs was 4,385.

In all, twenty-nine different programs were offered free to the children of the city and suburbs during the year, and the total attendance at these programs was 42,991.

That the children's entertainments are filling a definite need is evidenced by the excellent cooperation extended to the Museum in giving publicity to these programs. Both newspapers and radio stations have helped. Many suburban papers have printed the programs, and from time to time have called attention to special features on the programs. The following were especially consistent in their efforts to further the work of the Museum in behalf of the young people of the community: the *Chicago Daily News* and Radio Station WMAQ; the *Prairie Farmer* and Station WLS; the *Chicago Tribune* and Station WGN; Station WCFL; the *Chicago Evening American*; the *Chicago Daily Illustrated Times*; the *Chicago Herald and Examiner*, and the *Chicago Evening Post*.

Thanks for films and slides loaned for the programs are due to the United States Department of Agriculture, the Rothacker Film Corporation, the Izaak Walton League, the General Electric Company, the Sinclair Refining Company, the Chicago Public Library, and the Art Institute of Chicago.

Three series of Museum Stories for Children were written by members of the Raymond Foundation staff, and copies were handed to all attending the entertainments. During the summer the stories were kept at the North Door and handed to visiting children. Several schools and libraries are using the stories as natural history source material.

The following list gives an idea of the variety of topics to be found in Series XIII, XIV and XV of Museum Stories for Children:

Story of Limestone.
Holidays and Games of Japanese Children.
Story of Carbon.
Camels.
Paper and Silk from Plants.
A Feathered Fisherman.
Common Flower Friends.
Cats of Many Lands.
The Grand Canyon.
Trap Plants.

Story of Mr. and Mrs. Garter Snake.
Sand Dunes.
Sea Weeds.
Musquash, the Muskrat.
Story of Bread.
Frogs.
Totem Poles.
Volcanoes.
The Taj Mahal.
Storks.

A total of 45,000 copies of these stories was printed and distributed.

LECTURE TOURS FOR CHILDREN.—The number of groups from public, parochial, and private schools was the largest handled since the guide-lecture service was inaugurated. Special emphasis was placed on tours which correlated with school curriculums or were of special value to children's clubs, and Scout or church groups. The following table shows how the groups were distributed:

	Number of schools	Attendance
Tours for children of the Chicago schools		
Chicago public schools	269	11,338
Chicago parochial schools	28	970
Chicago private schools	15	273
Tours for children of suburban schools		
Suburban public schools	181	6,559
Suburban parochial schools	12	620
Suburban private schools	20	413
Tours for special groups		
Children's clubs	34	1,984
Other organizations	45	3,886
Out-of-town groups	4	1,100

In all, 608 groups were given guide-lecture service and the attendance was 27,143.

EXTENSION LECTURES.—Extension lectures were offered, as in previous years, to the public schools of the city. The subjects presented in the junior and senior high schools were as follows:

Field Museum and Its Work.	The Romans: Their Arts and Customs.
Animals of the Past.	Trees of the Chicago Area.
Animals of the Chicago Area.	Wild Flowers of the Chicago Area.
Bird Life.	Story of Iron and Steel.
Reptiles and Insects.	
The Ancient Egyptians.	

For presentation in the elementary schools the following series was offered:

For Geography and History Groups—South America.	
	North American Indians.
	Glimpses of Chinese Life.
	Native Life of the Philippines.
	Marcus, the Roman.
	Ptahhotep, the Egyptian.
	Migisi, the Indian Lad.
	Field Museum and Its Work.
	A Trip to Banana Land.
	Coffee, Chocolate and Tea.
	Story of Coal and Iron.
	Story of Cotton and Flax.
	Story of Silk and Wool.
	Food Fishes of the World.

For Science and Nature Study Groups—African Animals.
 American Fur-bearers.
 Chicago Birds.
 Chicago Mammals.
 Chicago Trees.
 Chicago Wild Flowers.

These lectures were given also before school clubs, parent-teacher associations, at conferences, and at camps. The following table gives an idea of the groups reached by Field Museum extension lecturers during the year:

	Number of groups	Attendance
In Chicago public schools	604	206,678
Parent-teacher associations	4	845
Foreign mother groups	2	165
School clubs	8	423
Camps Algonquin and Wasepe	26	1,666

The total number of extension lectures presented by the staff of the Raymond Foundation was 644, and the total attendance at these was 209,777.

ACCESSIONS.—The Raymond Foundation acquired during the year 576 stereopticon slides for use in the extension lectures; 22 negatives for making slides; and 125 prints for the office records, all made by the Division of Photography. It also received as gifts from the United Fruit Company, Boston, 16 additional slides for the lecture "A Trip to Banana Land," and 26 copies of the revised version of the lecture. Compton and Company, Chicago publishers, presented as a gift a set of *Compton's Pictured Encyclopedia* in ten volumes.

NATURE STUDY COURSE

In response to a request from the Educational Director of the Chicago Council of Boy Scouts of America, a series of talks on natural history topics was especially arranged for the scoutmasters of the city. The series consisted of five meetings. At each a member of the Raymond staff presented a subject which would be of assistance to leaders of Scout groups, and also assisted in the conference which followed. The subjects covered were as follows:

- April 19—*a.* Geography of the Chicago Area.
b. Study of Mammals.
- April 26—Birds of the Chicago Area.
- May 3—Ecology and Plant Life.
- May 10—Trees.
- May 17—Reptiles, Amphibians and Insects.

The total number of these lectures and conferences was ten, and the attendance was 703.

LECTURE TOURS FOR ADULTS

As in the preceding years, the services of Museum guide-lecturers were offered, without charge, to clubs, conventions, and other organizations, and to Museum visitors in general. For the public 136 general tours and 376 tours covering specific exhibits were arranged. Printed monthly tour schedules were placed at the main entrance for distribution to visitors. Each month copies of the schedule were sent to libraries, social settlements, retail stores and to some of the railroads bringing special groups into the city.

Five hundred and twenty-eight groups took advantage of the guide-lecture service during the year, with a total attendance of 8,684 individuals.

EDUCATIONAL MEETINGS

The use of the small lecture hall was extended to twenty-two educational and civic groups. These meetings were attended by 1,708 persons.

On Armistice Day an Americanization program under the auspices of the Chicago Board of Education was held in the James Simpson Theatre. The attendance was 740.

A series of Chamber Music Concerts, sponsored by Mrs. Elizabeth Sprague Coolidge, was presented in the Theatre on October 12, 13, 14, 15 and 16. The number of persons who attended them was 5,831.

RADIO BROADCASTING

Radio broadcasts by members of the Raymond Foundation staff were given in connection with the public school radio programs which are sponsored by Station WMAQ. During the year, twelve talks were presented to grades ranging from the first to the eighth. The talks given during September, October, November and December were planned to correlate with the new course of nature study being given in the elementary grades.

During the summer course of entertainments, broadcasting material was prepared each week for the radio stations giving publicity to the children's programs.

TOTALS.—The total number of groups receiving instruction by means of lectures, entertainments and tours was 1,852, with an aggregate attendance of 314,276. This figure includes both the adults and the children participating in Museum educational activities.

DIVISION OF PUBLICATIONS

The publications of the Museum, as in previous years, were generously distributed during 1930. To institutions and individuals engaged in scientific work there were sent 10,030 copies of scientific publications, 3,133 leaflets, and 2,427 miscellaneous publications. Also, 5,660 copies of the 1929 Annual Report of the Director, and 3,914 leaflets were sent to Members of Field Museum. Sales during the year totaled 1,041 scientific publications, 8,734 leaflets and 12,368 miscellaneous publications and pamphlets.

Thirty-three large boxes of books were shipped to Washington, D.C., for distribution in foreign countries, through the exchange bureau of the Smithsonian Institution, to museums, research organizations, scientific societies and individuals from whom valuable exchange material is obtained for the Library of Field Museum. A like quantity of Museum books was sent by stamped mail to names on this institution's domestic exchange list.

The pressing need of more storage space for both the reserve and open stock of publications necessitated a readjustment of these books. Reconstruction of the racks in the vault housing this stock, numbering some 330,000 copies, provided the shelf space to hold these and many future publications. Supplementary to moving the packages of previously issued numbers from the old shelving and transferring them to the new racks, 1,010 packages of books issued in 1930 were wrapped and labeled for storage in the stock room.

Two notable special publications were issued during the year. One of them is *Flora of the Indiana Dunes* by Donald C. Peattie, well-known writer and botanist, formerly on the staff of the United States Department of Agriculture. The book is a complete record in non-technical language of the 1,400 different kinds of plants found in the dunes area, long known as one of the richest and most interesting botanical regions in the United States. The popularity of this book during the flowering season of the year is indicated by its large sale.

The second of these special publications was issued in November. It is a portfolio of accurate lithographic reproductions of paintings of birds and mammals, made by the late Louis Agassiz Fuertes, noted American artist, while he was a member of the Field Museum—*Chicago Daily News* Abyssinian Expedition of 1926–27. The publication of these was made possible through the generosity of Mr. C. Suydam Cutting, an Honorary Member and Patron of Field Museum,

who was also a member of the Abyssinian expedition. The original paintings, including 108 subjects, were purchased by Mr. Cutting after the artist's untimely death and presented to the Museum. From this collection, thirty-two were selected for reproduction by offset lithography. Of these, twenty-eight are studies of birds and four of mammals, among them many of the finest and most characteristic species found in Abyssinia. At the time of his coronation, Field Museum presented to His Majesty the Emperor Haile Selassie I, of Ethiopia, a set of these reproductions in a handsomely bound portfolio of special design.

In compliance with individual requests, the Museum sent out 110 copies of *Field Museum and the Child*, a pamphlet outlining the work carried on among the school children of Chicago, by the N. W. Harris Public School Extension and the James Nelson and Anna Louise Raymond Foundation of Field Museum. This pamphlet was given wide distribution during 1928 and 1929.

As in former years, the Museum's domestic as well as its foreign exchange list was increased by the addition of an appreciable number of names.

Thirteen additions to the regular series of Field Museum publications were issued, two of which were anthropological, seven botanical, three zoological and one the Annual Report of the Director for 1929. Besides these, five numbers were added to the general leaflet series, and two special publications, two memoirs, one technique series item, and three guide numbers were published. Following is a detailed list of the various publications:

Publication
number

- 270.—Botanical Series, Vol. VII, No. 1. The Rubiaceae of Colombia. By Paul C. Standley. January 22, 1930. 175 pages. Edition 1,000.
- 271.—Report Series, Vol. VIII, No. 1. Annual Report of the Director for the Year 1929. January, 1930. 265 pages, 20 photogravures. Edition 7,626.
- 272.—Zoological Series, Vol. XVIII, No. 1. Descriptions of Five New Indo-Chinese Birds. By Outram Bangs and Josselyn Van Tyne. April 9, 1930. 4 pages. Edition 1,010.
- 273.—Zoological Series, Vol. XVII, No. 6. Reptiles of the Marshall Field North Arabian Desert Expedition, 1927-1928. By Karl P. Schmidt. May 10, 1930. 10 pages, 1 photogravure, 1 map and 1 zinc etching. Edition 1,048.
- 274.—Anthropological Series, Vol. XVII, No. 2. Ethnology of the Mayas of Southern and Central British Honduras. By J. Eric Thompson. June 7, 1930. 191 pages, 24 photogravures and 1 map. Edition 1,037.
- 275.—Botanical Series, Vol. IX, No. 1. The Differential Analysis of Starches. By James B. McNair. June 19, 1930. 44 pages. Edition 1,074.

- 276.—Botanical Series, Vol. IX, No. 2. A Study of Some Characteristics of Vegetable Oils. By James B. McNair. June 19, 1930. 24 pages. Edition 1,024.
- 277.—Botanical Series, Vol. VIII, No. 1. Studies of American Plants—III. By Paul C. Standley. July 9, 1930. 74 pages. Edition 1,046.
- 278.—Botanical Series, Vol. VIII, No. 2. Spermatophytes, Mostly Peruvian—II. By J. Francis Macbride. July 9, 1930. 56 pages. Edition 1,054.
- 279.—Botanical Series, Vol. III, No. 3. Flora of Yucatan. By Paul C. Standley. September 11, 1930. 338 pages. Edition 1,224.
- 280.—Anthropological Series, Vol. XVIII, No. 2. Geophagy. By Berthold Laufer. September 26, 1930. 102 pages. Edition 1,530.
- 281.—Botanical Series, Vol. VIII, No. 3. Studies of American Plants—IV. By Paul C. Standley. October 22, 1930. 106 pages. Edition 1,045.
- 282.—Zoological Series, Vol. XVII, No. 7. Birds of the Marshall Field Peruvian Expedition, 1922–1923. By John T. Zimmer. December 10, 1930. 250 pages, 1 map. Edition 1,028.

LEAFLETS

- Anthropology, No. 29.—Tobacco and Its Use in Africa. By Berthold Laufer, Wilfrid D. Hambly and Ralph Linton. January 28, 1930. 45 pages, 6 photogravures. Edition 3,025.
- Botany, No. 14.—Indian Corn. By James B. McNair. February 6, 1930. 34 pages, 6 halftones, 1 cover design. Edition 4,925.
- Botany, No. 15.—Spices and Condiments. By James B. McNair. August 7, 1930. 64 pages, 11 zinc etchings, 1 cover design. Edition 2,036.
- Botany, No. 16.—Fifty Common Plant Galls of the Chicago Area. By Carl F. Gronemann. September 4, 1930. 30 pages, 51 zinc etchings, 1 colored cover design. Edition 1,599.
- Zoology, No. 12.—The Salamanders of the Chicago Area. By Karl P. Schmidt. October 8, 1930. 16 pages, 2 photogravures, 1 zinc etching, 1 colored plate, 1 cover design. Edition 3,020.

MISCELLANEOUS PUBLICATIONS

- Anthropology, Memoirs, Vol. II, No. 2. Archaeological Explorations in Peru. Part II. The Northern Coast. By A. L. Kroeber. December, 1930. 72 pages, 17 photogravures, 3 zinc etchings, 1 map. Edition 1,515.
- Geology, Memoirs, Vol. I, No. 1. Studies of Fossil Mammals of South America. A Partial Skeleton of Homalodontotherium from the Santa Cruz Beds of Patagonia. By William Berryman Scott. New Carnivorous Marsupials from the Deseado Formation of Patagonia. By William J. Sinclair. June, 1930. 39 pages, 8 photogravures, 8 explanation pages. Edition 1,037.
- Flora of the Indiana Dunes. By Donald C. Peattie. May, 1930. 432 pages, 38 halftones. Edition 2,497.
- Technique Series, No. 3. Restoration of Ancient Bronzes and Cure of Malignant Patina. By Henry W. Nichols, with foreword by Berthold Laufer. August, 1930. 52 pages, 11 photogravures. Edition 1,040.
- Album of Abyssinian Birds and Mammals. From paintings by Louis Agassiz Fuertes. November 17, 1930. A portfolio of 32 lithographs, and 4 pages of text by Wilfred H. Osgood. Edition 2,500.
- Anthropology, Guide, No. 6. Ethnology of Africa. By Wilfrid D. Hambly. January 28, 1930. 226 pages, 42 photogravures, 4 maps. Edition 1,216.

General Guide. Thirteenth Edition. 38 pages, 1 photogravure, 3 zinc etchings. Edition 4,913.

General Guide. Fourteenth Edition. 39 pages, 1 photogravure, 3 zinc etchings. Edition 9,060.

POST CARDS.—The anticipated increase in picture post card sales was realized, the total number being 183,235, an increase of more than 22,000 over the 1929 sales. Further increases may be expected, as the conveniently located card stands permit easy selection of the large assortment of cards, to which are constantly being added new and interesting subjects.

LIBRARY

During the year there have been added 2,844 books and pamphlets to the Library, which was especially fortunate in receiving publications from many of its exchanges not represented in the previous year's accessions. There were also a number of new exchanges arranged with societies and individuals both in this country and abroad which resulted in the acquisition of much valuable material.

One of the aspirations of the Library is to complete more of the sets of important periodicals, and each year a little is accomplished in this direction. In 1930 the first fifty volumes of the *Geographical Journal* of the London Geographical Society were obtained, making the file complete. The early volumes of the *American Fern Journal* were purchased, and also some twenty of the early volumes of the *Bulletin de la Société Botanique de France*. The *Union List of Serials* has proved to be an invaluable aid, and through its instrumentality opportunities are offered to complete or nearly complete various sets of periodicals.

Gifts have been received that have strengthened various parts of the Library. Mr. G. A. Pfeiffer, of New York, recently presented the four volumes of the reprint of *Nippon*, by Franz von Siebold. This is an important addition to the collection of works on Japan, as it contains much regarding the early history of the country that can be obtained from no other source. Another gift of beautifully illustrated books of the art of Fusajiro Abe from Japan is a welcome addition to this same collection. It was presented by Mr. Abe himself, a resident of Sumiyoshi, near Kobe. From Georges-Marie Haardt were received *La croisière noire, Première traversée du Sahara en automobile*, and other interesting material on Africa.

Among the purchases of the year were Lindley, *Genera and Species of Orchidaceous Plants*, 1830–40, and Bateman's *Second Cen-*



CANVASBACK

This species is a member of the family Anatidae, and is one of the most common of the waterfowl of the world. It is a large, powerful bird, with a long neck and a broad, flat bill. The male has a dark head and neck, with a white patch on the throat. The female has a brown head and neck, with a white patch on the throat. The body is dark, with a white patch on the wing. The tail is dark, with a white patch on the tip. The legs are dark. The canvasback is a very hardy bird, and is able to live in the coldest climates. It is a very common bird in the United States, and is found in large numbers in the Great Lakes region. It is a very common bird in the United States, and is found in large numbers in the Great Lakes region. It is a very common bird in the United States, and is found in large numbers in the Great Lakes region.

No. Z-267

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No. Z-267

TYPE OF CASE LOANED TO THE SCHOOLS OF CHICAGO BY THE N. W. HARRIS PUBLIC SCHOOL
EXTENSION OF FIELD MUSEUM OF NATURAL HISTORY
One-sixth actual size

ture of *Orchidaceous Plants*, 1867; Aiton, *Hortus Kewensis*, five volumes, 1810-13; *Annales, Musei Botanici Lugduni Batavorum*, four volumes, 1863-69; Ledebour and others, *Flora Altaica*, four volumes, 1829-33; Martius, *Specimen Materiae Medicae Brasiliensis exhibens plantas medicinales quas in itinere per Brasiliam 1817-1820 observavit*, 1824; four volumes of Siren, *History of Early Chinese Art*; Preuss, *Monumentale vorgeschichtliche Kunst*; Maudslay, *History of the Conquest of New Spain by Bernal Diaz*; Waldeck, *Voyage pittoresque et archéologique dans la Province de Yucatan*, 1838; Obregon, *History of the Sixteenth Century Explorations in Western America*, translated, edited and annotated by George P. Hammond and Agapite Reye; Susemihl and Schlegel, *Die Vögel Europas*, a rare work planned for an extended production but never finished; *Nouveau dictionnaire d'histoire naturelle*; the three volumes of Pallasia and Schrank's *Fauna Boica*, 1798-1803, which contains the first complete account of the zoology of southern Germany; and Ameghino, *Contribucion al conocimiento de los mamiferos fosiles de la Republica Argentina*, 1889, a very rare and important work, essential for the study and identification of South American fossil mammals.

The appearance of the stacks in the general Library has been much improved since the books have all been vacuum cleaned. The cleaning of the departmental libraries is being carried forward as rapidly as possible.

It is a great satisfaction to find that the Library is more and more used each year, and in 1930 the number of students utilizing its facilities has shown a marked increase. It is frequently commented by visitors that certain material they need can be found nowhere else in the city.

There were about 700 visitors (exclusive of members of the Museum staff) to the Library in 1930. Many of these were students from universities in and near Chicago. From publishers' offices there have been persons desiring reference material. There were also representatives of manufacturing firms seeking material for booklets; authors doing research work; and other persons in search of various kinds of information. The Library also furnished information on a multitude of subjects to many inquirers by telephone.

For many years the Library has received an increasing number of duplicate books and pamphlets from various sources. In 1929 these were brought out of storage, unpacked, and efforts were begun to distribute them to institutions where they would be of use. This work was continued in 1930. Many of the books and pamphlets

were returned to the institutions from which they originally came, some were sold, and others were exchanged for desirable material. Lists have been made of part of the material, and it is hoped to accomplish still more this coming year.

At different times during the year the Library has been able to lend books to other institutions, and it has in turn been favored by the courtesy of loans from other libraries. The borrowed books have been of value to Museum workers and have been greatly appreciated. The courtesy of these loans is acknowledged with gratitude.

During the year there were sent to the bindery 630 books which were bound in 490 volumes. Monthly installments of author cards totaling 8,500 were received from the John Crerar Library.

There were 3,334 books accessioned, and 7,178 cards written and added to the permanent catalogue.

EXPEDITIONS AND RESEARCH

ANTHROPOLOGY.—During the year four expeditions were operating in the interest of the Department of Anthropology.

This summer the Museum again took up research among the ancient Pueblo Indians by organizing an archaeological expedition to the southwest under the leadership of Assistant Curator Paul S. Martin, who left Chicago by motor car on June 13 and returned in October. The actual length of time spent in the field amounted to fourteen weeks. The expedition was financed from a fund donated by Julius Rosenwald and the late Augusta N. Rosenwald.

The southwestern corner of Colorado, which was chosen as the field of operations, is a region rich in prehistory, and is probably the place of origin for much of the southwest prehistoric culture. It was a center which extended its influence to other communities. Consequently this area is extremely important and offers great possibilities to the researcher.

The ruin explored by Dr. Martin is known as the Lowry ruin. It is a large, stone-covered mound approximately 200 feet long, 100 feet wide, and twenty-five feet high. The problems involved were to investigate a large site in an area where no work had previously been done; to excavate a large ceremonial chamber unique for that region and unusual in superficial appearance; and to correlate the results of this work with the cultures of other near-by areas. All of this, however, could not be accomplished during one season. In fact,

excavations must be continued for at least three seasons to complete this task satisfactorily.

Before any excavation on the mound was undertaken, a two-mile road was cut, a cistern was dug and cemented, a 500-foot mine railroad was installed, and trenches with an aggregate length of 350 feet were made. Then the excavations proper began. In all, eleven secular or living rooms and one kiva or ceremonial chamber were completely excavated. These rooms were on an average twenty by ten feet in area, and from twelve to fourteen feet deep. Twelve kitchen-midden burial grounds were thoroughly explored, and twenty-six graves were found in them. In all, about 1,500 tons of *débris* were removed.

The site of the Lowry ruin was apparently a favorite one, for, while digging exploratory trenches, evidence was found of three or four occupations. A near-by spring perhaps explains why this spot was so well liked.

After the main walls of the ruin had been located, it was decided to expose first a kiva. A kiva is a circular, underground chamber in which religious performances were held. It was also used as a men's clubhouse. The excavation of this unit was very satisfactory because it brought to light interesting, extraordinary architectural features. It was found that this kiva rested on an earlier or older kiva. In addition to this, some unique fresco paintings were found on the walls of both upper and lower kivas. This fact is remarkable because such perishable decorations are rarely preserved in a room which is exposed to the elements, and because such designs are generally confined to pottery decoration.

The dwelling rooms which were excavated varied in interest, although two are outstanding. One was filled solidly with about 3,000 cubic feet of wood ash. It is estimated that more than 7,000 tons of wood must have been consumed to produce this amount of ash. Mixed with the ash were many pieces of broken pottery. By taking samples of these potsherds from different levels, it was possible to obtain stratigraphic evidence of the cultures which had flourished on this site. Evidently this room for many generations served as a place for dumping refuse. One half of a bowl was found in it, while the other portion was dug out of a trench more than 200 feet away.

Another room is particularly interesting because its ceramic stratigraphy bears out that of the first-mentioned room, and likewise because both ceramic series are perfectly supported by the archi-

tectural stratigraphy of the second room. Sufficient data were thus obtained to warrant the conclusion that there were four occupations of this site, and that many years may have elapsed between each. On the floor of the second room were found fourteen pieces of pottery, just as they had been left by the last inhabitants. Judging from this evidence, the history of the Lowry ruin may date back 1,500 to 2,000 years.

At the close of the season's work, eight to ten inches of soil were left on top of the walls. This dirt-capping will shed the rains of the winter and thus temporarily protect the masonry, which is held together only with mud mortar. In 1931, however, it will be imperative to cover the tops of these unprotected walls with cement for purposes of preservation. Photographs were taken whenever possible, and 1,500 feet of motion picture film were exposed.

The Field Museum-Oxford University Joint Expedition continued its operations at Kish, its eighth consecutive season, from November 23, 1929, to March 18, 1930. Mr. L. C. Watelin again acted as director of excavations and was assisted by his son, Mr. René Watelin, and by Mr. I. Martel. The general supervision of the expedition's activities, as in previous years, was in the hands of Professor Stephen Langdon of Oxford University. The principal object of the work during this season was to determine through the opening of a certain trench the homogeneity of the population of Kish in the depth of the Tell; to expose the surface down to the plain level through other trenches, in order to gain access in the future to the lower levels; and to reach by means of soundings virgin soil on a larger stretch of territory.

Mr. Watelin's efforts were concentrated on the section west of the Tell, which two trenches had laid bare down to the level of the plain. From this level he sank a deep shaft in order to be certain that there was a correspondence between the strata of this part of the Tell and the strata excavated during the previous year in another trench. As in the latter, the excavations brought to light, beneath plain level, constructions belonging to an epoch which is not far from the reign of Sargon I, but during which the use of plano-convex bricks was abandoned. Whenever this type of brick was found, it was in every case a secondary use of such brick, which was clearly demonstrated by the vault of a water conduit.

The constructions overlay a stratum of earth of indeterminate character. A certain number of sections composed of broken, baked bricks rested directly on the floor stratum which was again found



CASE OF PAINTED PLASTER REPRODUCTIONS
OF EGYPTIAN STATUARY

(Hall J)

Showing method of installation

equally distributed at a depth of two and one-half meters below the level of the plain. No form of pottery vase found in the lower strata appeared in the upper levels; no cylinder seal found in the lower levels appeared above. Flint implements appeared above and below; those below were always so closely connected with human habitations that they can be considered as *in situ*. Not a single polished type was found below the flood stratum. The tablets found beneath the flood stratum are archaic, but do not show pictographic signs.

From the flood stratum, the excavations penetrated through a layer of earth mixed with ashes and pottery. Without any apparent evidence, down to a depth of from three to five and one-half meters, the beds of ashes and of pottery are more regular, and the habitats which they indicate are somewhat regularly distributed. At this level some constructions appeared, and a tomb was found.

As one trench yielded at its northern end and at plain level some interesting objects, Mr. Watelin decided to sink a similar deep trench into the northern part of the Tell. The workmen uncovered in the northern trench a part of a monument which extends over a portion still unexcavated. The new trench disclosed also several tombs with jars of the same type as those found in Cemetery A, as related in previous Reports. These perhaps can be dated at about 3000 B.C. This work was pushed forward to a depth of two meters. It should be pointed out that in this section of the territory the slope of the Tell comes down to the level of the plain, and that for this reason there is little earth at this point above the level of the plain. Consequently inscriptions dated from the period of Hammurabi were found there, and such turned up also at two or three meters of depth below the highest point of the surface of the Tell. In fact, the same quantity of earth covered the tablets in both cases.

In January the excavations reached a depth of two meters beneath water level, and, by means of an efficient hydraulic method, the stratum containing polychrome pottery has yielded a large number of fragments of beautiful painted vases precisely like those previously discovered at Jemdet Nasr. Another kind of pottery is coated all over with a red engobe. In connection with this pottery were found low supports of terra cotta, a decorated cylinder of white paste, a long bead of paste, and a few stone beads. The flint tools found there are of microlithic shape and were made where found. The use of bitumen was known, and certain univalve shells were coated with this substance for an unknown purpose.

As usual the strata on the surface of the Tell proved fruitful only to a small extent. Nevertheless they furnished this season several heads of alabaster statuettes, a terra cotta plaque, and a plaque of engraved schist; also a head of lapis lazuli, which was secured for Field Museum. Further, inscriptions in stone and three or four hundred tablets or fragments of such from different periods, weapons of metal, as well as objects and statuettes of baked clay were discovered. The results of the soundings, in the opinion of Mr. Watelin, are of capital importance for tracing the origin of civilization, as will be demonstrated in subsequent technical studies. Mr. Watelin holds that the civilization reached at Kish, despite some superficial analogies which it may present with other sites, certainly is the oldest of the civilizations of Chaldea and of Elam.

In the plain near the Tell Bandar, Mr. Watelin excavated a collective Parthian tomb constructed of bricks. He recovered from it a score of crania and several long bones. A large jar found in this tomb harbored the remains of eight skeletons.

The ninth season of work at Kish was begun on November 15, 1930, and is continuing into 1931. Mr. Watelin reports that he will use part of his time this season to continue his search for large tombs, and that he already has discovered two in cutting the ground toward the great Ziggurat.

The Frederick H. Rawson-Field Museum Ethnological Expedition to West Africa, under the leadership of Mr. Wilfrid D. Hambly, Assistant Curator of African Ethnology, arrived at Lagos, Nigeria, early in October, 1929. This part of the expeditionary work in West Africa followed closely upon the investigation carried out in Angola earlier in the year and described in last year's Report. Starting from Lagos a journey of five thousand miles was made, the greater portion of it in a motor truck. Mr. T. C. Bramley, of Lagos, was placed in charge of motor transport over the long and difficult routes. In the early stages of the journey flooded roads made progress tedious, but the expedition was rewarded by excellent opportunities for collecting at Ibadan, Iseyin, Ilorin, and Bida. The last-named town is particularly interesting because of its brass work and glass making. Sokoto in the far northwest of Nigeria, and the great emporium of Kano, provided opportunities for observing typical native crafts. At Kano the collections were augmented by products of the silversmiths, leather workers, basket makers, potters, and weavers. Subjects for photography were many and varied, as the season was the busiest of the year.

From Kano the expedition worked northward to Zinder, thence westward through Maradi and Tessowa to Tahua on the southern border of the Sahara Desert. Although the culture of this French Niger territory is not rich, the material gathered is valuable because the region has been but little visited by collectors. On returning to Kano preparations were made for a long eastward journey to the shore of Lake Chad. After making a halt at Potiskum and Maiduguri the motor transport was abandoned in favor of horse transport; this was necessary on account of the sandy roads in the immediate vicinity of Lake Chad. At the small village of Baya Seyarum on the west side of Lake Chad the Buduma people were studied. Collections relating to their lake trade and fishing were made, while their physical types, their methods of fighting behind large wooden shields, and their mode of navigation, formed attractive subjects for motion picture work. On the return journey to Lagos a visit was made to the Angas pagan tribes in the high plateau near Pankshin. The material collected in this region is particularly instructive, as many of the objects are of advanced technique.

From the Bauchi Plateau the expedition proceeded to the river Benue, where a crossing was made at Ibi. Contact with the Munshi country added many interesting objects and photographs to the collections. The return from the Munshi country to Lagos was made by way of Onitsha, center of the Ibo country, Benin, and Ife. At Benin was secured a series of objects illustrating the processes of brass casting. At Ife, where sacred groves abound, data on a considerable amount of legend and photographs of sacred objects added to the scientific results of the expedition. Records of the Umbundu language and of drum music were taken on the dictaphone. Four thousand feet of motion pictures bearing on native crafts, games, and ceremonies in Angola and Nigeria were made. The still pictures are about 700 in number.

Assistant Curator Henry Field left Chicago early in June to obtain additional material and data for Chauncey Keep Memorial Hall in which the racial divisions of mankind will be represented, and for the Hall of Prehistoric Man. He proceeded to England and shortly afterwards to Paris where plans were discussed with Miss Malvina Hoffman, the sculptress commissioned to prepare exhibits in Chauncey Keep Memorial Hall, and Abbé Henri Breuil, Professor at the Collège de France. After a trip to the Dordogne and Pyrenean region of France where he purchased many specimens for the Hall of Prehistoric Man, Mr. Field visited the important museums

and private collections in central Europe during the months of September and October.

In view of the plan to have Chauncey Keep Memorial Hall ready during the early part of 1933 it was necessary to assist Miss Hoffman in obtaining models and data on the selected racial types to be modeled. At the same time skeletal material, charts, casts, and photographs for exhibition had to be obtained. It also seemed desirable to secure a series of racial type photographs to form the basis of a study collection.

Every effort was made to insure the scientific accuracy of Miss Hoffman's work. The cooperation of a number of eminent anthropologists was invited to give Miss Hoffman advice on special problems. Among these are Professor Sir Arthur Keith, Dr. A. C. Haddon, and Mr. L. H. Dudley Buxton in England; Dr. P. Rivet and Mr. Lester in Paris; Professor Theodor Mollison in Munich; Professor Josef Weninger and Dr. Viktor Lebzelter in Vienna; Professor Eugen Fischer in Berlin; and Baron Dr. Egon Freiherr von Eickstedt in Breslau. Photographs of racial types were selected from the collections of the British Museum, the Musée du Congo Belge at Tervueren in Belgium, the ethnological museums in Munich, Dresden, and Berlin, and the anthropological institutes of Berlin, Munich, Prague, and Vienna. In central Europe a series of excellent photographs and casts was obtained through the courtesy of Professor Josef Weninger of the Vienna Anthropological Institute. This series includes many central-Asiatic and Russian physical types, and since it consists mainly of unpublished material, Professor Weninger's cooperation with Field Museum is the more appreciated.

Among others who have generously assisted the project are Mr. Georges-Marie Haardt, leader of the Citroën Trans-Sahara Expedition; Dr. M. Kuesters of the ethnographical museum in Munich; and Mr. Arthur S. Vernay of the Vernay-Lang Kalahari Expedition of Field Museum, who obtained an excellent series of photographs of Kalahari Bushmen for the Museum. A large number of books and pamphlets were purchased for the Museum anthropological library.

The proposed plan for a hall dealing with the physical characters of living peoples of the world was welcomed enthusiastically among scientists in Europe, and the members of the anthropological institutions rendered every possible assistance.

For the purpose of rounding out collections for the proposed Hall of Prehistoric Man it was necessary to acquire a large series of

objects ranging from the oldest stone age down to the iron age. Assistant Curator Field while in England made arrangements with Mr. J. Reid Moir to take charge of excavations at Ipswich, which were expected to yield implements from the earliest period of human workmanship. Work progressed very favorably during the summer, and Mr. Moir obtained an excellent series of artifacts of Pliocene man from below the Red Crag. During July and August Mr. Field, the Abbé Breuil and Mr. Harper Kelley visited the Dordogne and Toulouse region where Mr. Field purchased specimens selected from a number of local collections. The most important collection obtained in Europe was the property of Mr. Eugène Viot, Château-Colligny, Loiret, France. Mr. Viot had spent more than forty years in gathering these objects, which were all carefully determined according to their places of origin. Among these are many beautiful exhibition specimens including prehistoric engravings on bone, as well as many paleolithic, neolithic, bronze, and iron age objects.

In central Europe additional material was secured. Franz Roubal, Vienna artist, was commissioned to undertake a series of drawings of the more important Pleistocene fauna contemporaneous with prehistoric man in western Europe. Arrangements were made with Professor Absolon of the Moravske Zemske Museum in Brünn, Czechoslovakia, to obtain a small kitchen midden from Predmost in Moravia. This will include bones from mammoths and other Pleistocene fauna, and will be of considerable scientific and exhibition interest.

Dr. Henri Martin, discoverer of the La Quina and Le Roc prehistoric stations, rendered constant assistance to Mr. Field.

Mr. Amedée Forestier, well-known artist in London, through the courtesy of Mr. Bruce Ingram, editor of the *Illustrated London News*, was commissioned by the Museum to make a series of drawings depicting life in prehistoric times. Unfortunately, Mr. Forestier died suddenly in November before four of the sketches were entirely completed.

During December the collections purchased in France were sorted, labeled, and packed with the kind assistance of the Abbé Breuil and Mr. Harper Kelley, of Paris, who very kindly turned over his laboratory to Mr. Field for a period of three weeks. This opportunity is taken to express the Museum's appreciation of the kind assistance rendered by the Abbé Breuil and by both Mr. and Mrs. Harper Kelley.

The specimens and collections of books and pamphlets were packed and shipped through Marshall Field and Company's offices in London, Paris and Vienna, which rendered every possible assistance.

Dr. Alfred L. Kroeber, professor of anthropology in the University of California, and Research Associate in American Archaeology in Field Museum, completed a manuscript entitled *Archaeological Explorations in Peru. Part II: The Northern Coast*. This has been published in the Memoir Series as No. 2 of Volume II, and is illustrated by eighteen plates and three text-figures. This memoir presents the results of Dr. Kroeber's work in northern Peru during the Marshall Field Expedition to Peru in 1926.

Assistant Curator Albert B. Lewis completed the manuscript of a popular handbook, *The Ethnology of Melanesia*, which will serve as a useful guide to the Melanesian collections in Joseph N. Field Hall. Another publication of his, entitled *Carved and Painted Designs from New Guinea*, consisting of fifty-two plates, is being printed now as No. 5 of the Design Series, and may be expected off the press early in the coming year.

Assistant Curator J. Eric Thompson completed the report on the archaeological results of the First and Second Marshall Field Expeditions to British Honduras. This will be a companion publication to the monograph on the ethnology of the Mayas of central and southern British Honduras, which deals with the ethnological results of the two expeditions, and was published during the year. The archaeological report gives a detailed account of the contents of graves and votive caches in so far as they aid in the outlining of time and cultural periods in this part of the Maya area. Until a few years ago archaeological work in the Maya field was very wide in scope, and as a result somewhat superficial. The broad outlines of Maya history having been reconstructed, it now remains to fill in the small details to complete the picture. The development of styles of arts and crafts, particularly pottery, holds out the greatest hope for the reconstruction of Maya daily life, and Mr. Thompson's publication will cover one small portion of the whole Maya field. It is now in press, and should be available early in 1931. Mr. Thompson has also made progress with a monograph on the domestication and taming of animals in Mexico and the Maya area. Commencing with the domestication of the dog for ritualistic and culinary purposes, the scope of the monograph has been so extended as to embrace a large number of animals, birds, and species of bees.

Assistant Curator Hambly has been engaged in preparing for publication his researches into the ethnology of the Ovimbundu of Angola. His report includes chapters on hunting, fishing, agriculture, and several important industries such as the work of blacksmiths, wood carvers, and basket makers, as well as on social organization, methods of education, religious beliefs, and magical practices. The wax records of songs and drum music taken by him in the field have been electrotyped in the Psychological Institute of the University of Berlin, and thus are made permanent. Mr. Hambly has also prepared a publication entitled *Serpent Worship in Africa*, which is now in press. This is a subject around which there has been considerable controversy and confusion. This monograph contains a detailed discussion of the many types of belief and ritual which center around the serpent in Africa. Arguments are advanced in favor of a theory that the various beliefs associated with the serpent have arisen through observation of its anatomical characteristics and habits. The python worship of Africa has many unique features. A map has been prepared to indicate the distribution and probable lines of diffusion of beliefs and customs relating to serpent worship.

Assistant Curator Field has made good progress on preparing for publication a report giving the results of his expedition into the North Arabian Desert.

Curator Berthold Laufer prepared the manuscript of a study devoted to the domestication of the cormorant in China and Japan, an interesting problem, which has never before been investigated on the basis of Chinese and Japanese sources. This monograph will form one of a series dealing with animal domestications in Asia. His monograph, *Geophagy*, issued by the Museum in 1930, although a strictly technical study, was made the subject of a lengthy editorial in the *New York Times* of October 1, 1930. In this publication the Chinese types purchased by Dr. Laufer at Shanghai in 1923 have been used for the first time. This font of type is now properly arranged in two cabinets especially constructed for the purpose. The Curator also contributed seven articles to *Field Museum News*. Altogether seventeen articles were prepared by members of the staff of the Department of Anthropology for this bulletin, in addition to smaller items for which information was furnished.

As usual, heavy demands were made upon the time of the staff by correspondents, scholars, and other visitors calling for information, or asking for determination of material. Such requests are of almost daily occurrence.

BOTANY.—The Peruvian division of the Marshall Field Botanical Expedition to the Amazon, which commenced operations in 1929, was brought to a conclusion at the beginning of May, 1930, with the return of Mr. Llewelyn Williams, Assistant in Wood Technology, after spending twelve months in northeastern Peru searching for material to increase the study series of the Department.

Mr. Williams left Chicago at the beginning of March, 1929, for Pará, the Brazilian port at the mouth of the Amazon River. After a stay of a few days in that city he proceeded by steamer for 2,300 miles along the Amazon to Iquitos, the largest town in Peru on the eastern side of the Andes, where he established his headquarters. This town on the upper Amazon, some two hundred miles within the border of Peru, is situated in the heart of a tropical forest, and it proved to be most satisfactory as a base. Thanks to arrangements made by the State Department of the United States, and by the British Consul at Iquitos, formalities at the port were reduced to a minimum. In connection with Mr. Williams' stay in Iquitos the Museum acknowledges with appreciation the cooperation and valuable advice given him by several American and European concerns established there, and especially to Kahn Compania for their interest and assistance.

Mr. Williams spent the first few days collecting in the neighborhood of Iquitos, and gradually worked farther afield. Then with native aids he proceeded by canoes up the Itaya River, a small affluent of the Amazon, making collections on the way. After a stay of two weeks in that locality, which resulted in the collection of several hundred specimens, he devoted his attention to the forest around the estuary of the Nanay River which has its confluence with the Amazon a short distance below Iquitos. During their stay in that region Mr. Williams and his aids were accommodated in a house placed at their disposal by the Astoria Manufacturing and Importing Company of Long Island City, New York, which maintains a saw mill at this point. After two weeks of daily collecting in various directions it was decided to move to higher regions of the Nanay River. Accompanied by a guide with sufficient knowledge of the forest, and porters to handle the canoes, Mr. Williams journeyed for five days until a suitable spot for botanizing was reached. He then traveled through the forest in the direction of the Tigre River, an affluent of the Marañón. During the several weeks spent here, living in hastily erected huts, he succeeded in making a collection of several hundred specimens of woods and herbarium material,



RESTORATIONS OF FOSSIL TREE FERNS
Reconstructed in the Stanley Field Plant Reproduction Laboratories
and forming part of a Carboniferous forest exhibit
in Ernest R. Graham Hall (Hall 38)

including the most common palms, resins and fibers. One characteristic feature about the forest in this region is the magnificent scale of everything in size, variety and beauty. The number of woods is extraordinary, although only a few of the most important ones are used locally in the woodworking industries. The exploitation of timber of the Peruvian Amazon for export is of comparatively recent inception and at present is confined to mahogany and Spanish cedar, especially the former.

At the conclusion of the work in the upper Nanay area a visit was paid to Pebas, a small Yahua Indian village on the left bank of the Amazon below the estuary of the Napo River. The trip yielded highly satisfactory results. A great deal of information was obtained concerning various herbs, shrubs, and resins, some of which possess poisonous or narcotic properties. Much was learned of the uses made of these by the Indians for hunting, fishing or for treating ailments.

Thus far the party had collected in the forest along the north bank of the Amazon River. The next trips were conducted from a village situated on the bank of a stream on the south side and flowing parallel with the Amazon. When rubber was the controlling factor in the Peruvian Amazon region this large village, Caballo-cocha, formed an important center, but in the last decade its importance has waned. Several trips were made during the stay of sixteen days, principally in the direction of the Javary River. This is possibly the most unhealthy region in the Amazon basin, notorious for epidemics of beri-beri, yellow fever and malaria.

Thanks to the assistance and hospitality of Señor Jorge Giles, the manager of the largest sugar cane plantation in Loreto, at La Victoria on the border between Peru and Brazil, the party was able to make extensive trips through the dense forest extending northward towards the Putumayo River. The Putumayo is one of the largest tributaries of the upper Amazon, having its source in Colombia. In places the forest traversed was almost impenetrable.

After spending several months traveling in canoes along the Peruvian Amazon, and its tributaries and streams, for two hundred miles below Iquitos, and on foot in the forest between that town and the eastern frontier line that separates Peru and the neighboring republics of Brazil and Colombia, the party returned to Iquitos to pack and ship the material collected.

Before undertaking the next prolonged journey a short trip was made up the Itaya River to Paraiso and San Antonio where excellent collecting ground was found in the forest along the stream.

For the next six months Mr. Williams continued exploring and collecting in the forests that extend up to the highlands forming ramifications of the eastern Andean range. Leaving Iquitos in October he proceeded by a small river steamer to Yurimaguas, a town on the left bank of the Huallaga River, about five days' journey above the place of departure. Collecting in this region proved very fruitful. One of the most successful trips made from the base was that in the direction of Balsapuerto, a village at the foot of a high range of mountains that extends between the rivers Marañon and Huallaga. For the successful results attained in this region the Museum is indebted to Señor Enrique Pardo, at whose "finca," Fortaleza, Mr. Williams received generous hospitality.

Another locality where very satisfactory collecting conditions were found was a clearing made through the forest for a proposed railroad from Yurimaguas to the Pacific coast. One of the most difficult problems which confronts a botanist in a dense forest is that of securing adequate herbarium specimens of tall trees and high climbing vines. To cut a huge tree requires much time, and very frequently the tree hits the ground with such force that little of foliage, fruit or flowers is left on the branches. Often the crown falls upon some other tree which in turn has to be felled, or is caught high up in the air by twining coils of woody vines. A place where the forest is being cleared is therefore always advantageous in avoiding many of these difficulties. Along this right of way it was a fairly easy matter to obtain good specimens even of large trees. Among those cut by the expedition was one mahogany tree 180 feet in height.

Through the assistance of Señor Miguel Acosta, of Yurimaguas, porters were secured to carry the equipment, weighing several hundred pounds. A long journey, often in heavy downpours, was begun on foot over rocky and at times muddy paths. After six days of trudging through mud, fording streams, making treacherous ascents and descents, the Museum party arrived at Tarapoto. This town was made famous by the English botanist, Richard Spruce, who collected there seventy-five years ago. It lies in a plain which has the form of a vast natural amphitheater, encircled by ranges of mountains. The greater part of the plain has been denuded of its forest, except along the banks of the streams.

In the vicinity of the town the soil is loose sand covered chiefly with coarse grasses, shrubs, and low, scattered trees of secondary growth. The general character of the vegetation is intermediate between that of the Peruvian lowlands and the Andean highlands.

In order to reach good botanizing ground one has to go to the high ridges which are densely clothed with primeval forest.

During the month's stay at Tarapoto a trip was made to the top of "Cerro Pelado," whose summit is bare of trees—hence the name meaning "bald hill." Along this range Mr. Williams made an extensive collection of valuable specimens, including the quinine tree (*cascarilla*). In the vicinity he also collected specimens in a forest along the banks of the Huallaga River, as far as the estuary of the Mayo, a small river. Proceeding up the Mayo as far as Juan Guerra, a small Indian village, he collected in the forest extending towards the Sisa River. Returning by way of Morales, a village famed in northeastern Peru for its fine quality of tobacco, samples of the chief products of that area, such as cotton, cane sugar, tobacco, and coffee, were assembled for the Museum's economic collection.

When the work in the vicinity of Tarapoto was completed the party moved to Lamas, a village seventeen miles north. Indian porters were the only available means of transporting the collections over the difficult paths in this region. Three days were spent in the vicinity of Lamas before continuing the journey to Tabalosis on the far side of the deep valley of the Mayo, several miles from Lamas.

The following day's journey was a long and tedious one, through rocky, heavily wooded gorges with rugged cliffs and descents and over several streams. In the afternoon of the second day, after leaving Lamas, the members of the party reached San Roque at the base of a round, barren hill, known as Campana, which is surrounded by forest. The altitude at the summit of the hill is about 5,500 feet and that of the village which lies at its base is about 3,800 feet. A stay of two weeks at San Roque proved to be highly profitable. Many trips were made to the summit of the hill and through the forest westward in the direction of Moyobamba, about fifty miles away, where Andrew Mathews, the English botanist, collected almost one hundred years ago.

After a short stay at this place, Mr. Williams continued his journey westward to Chachapoyas. In places the trail was like a deep, narrow ditch through which the mules carrying the equipment could barely force their way. Only experienced mountain mules could make such rough, precipitous ascents and go down such steep declivities. At times the path was strewn with fallen trees and straggling vines. At Bagazan, an uninhabited spot at the foot of a tall mountain, known as Pishco-huayuna, the Amazonian forest

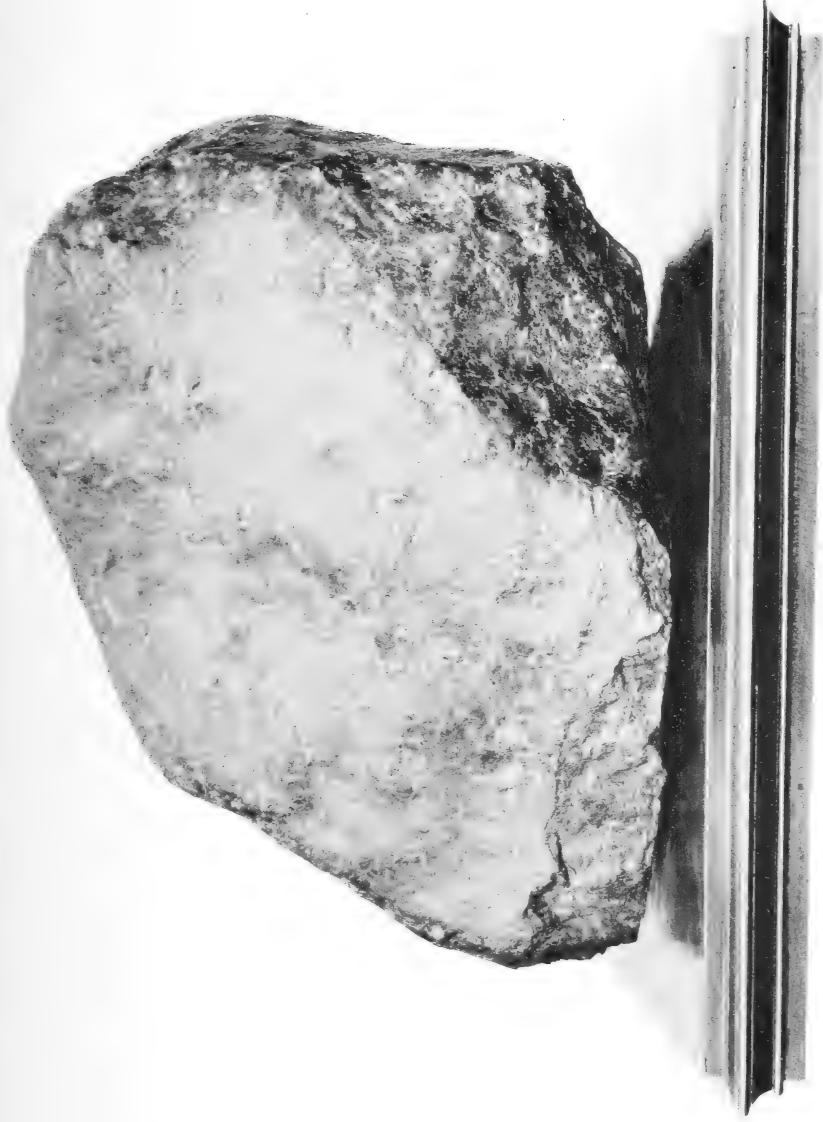
comes to an abrupt termination, 2,800 miles from the Atlantic seaboard.

Chachapoyas, the capital of the Department of Amazonas, is located near the foot of a lofty range in the midst of a fertile region. The principal objective of the visit to this territory was to secure specimens of a species of walnut known to exist in remote regions of the northern parts of northeastern Peru. Numerous representative specimens of grasses, herbs, shrubs, and trees growing in the locality were also assembled.

On completion of this work the Museum party retraced its steps to San Roque, an eight-day journey. With all the material preserved and packed, the expedition proceeded in a southeasterly direction through the forest to Shapaja, about seventy miles away, on the Huallaga River. At this place a raft was constructed of twenty trunks of "topa" (a species of balsa, the lightest wood known to exist). These were held together by five shorter pieces tied transversely with vines. This raft had to carry all the equipment, specimens and men. After negotiating whirlpools and rapids, the party reached Yurimaguas where all the material had to be redried, repacked and loaded aboard a steamer for transport to Iquitos, where all the specimens, numbering several thousand items, were assembled and packed for shipment to the Museum.

In addition to the large amount of herbarium material assembled, 22,500 specimens, representing 8,200 field numbers, the expedition brought back a large collection of woods and some fifty other economic specimens. The total number of various products collected while in the field during 1929 and part of 1930 amounted to 2,154 specimens, which augment to a considerable extent the large series of tropical woods in the Museum files. This comprehensive representation is of singular importance as it is the first collection of authentic wood specimens of the Amazon headwaters ever brought together. Up till now the woods from that region of Peru had been entirely unrepresented in any scientific institution of the United States or Europe. The samples are of unusual value as each is accompanied by corresponding herbarium material without which it is not possible, in the case of new or imperfectly known species, to determine with certainty the identity of wood specimens.

Mr. Hermann C. Benke, of Chicago, one of the most constant friends of the Museum's Department of Botany and always a generous contributor to its collections of North American plants, went farther afield in 1930 than usual in his search for desirable material.



STONE METEORITE

(Hall 34)

Fell February 17, 1930, at Paragould, Arkansas

Gift of Stanley Field

Weight, 745 pounds. About one-seventh natural size

He made a circle trip of some 4,000 miles to the southeast, crossing the Ohio River at Evansville, Indiana, going through Kentucky and Tennessee to the foothills of the Appalachians, and thence descending over Alabama to the coastal plain of the gulf about Pensacola, Florida, and Mobile, Alabama. From there on botanical exploration was conducted on the coast of the Gulf of Mexico, westward and southward all the way to the Rio Grande, and beyond into Mexico. The greater part of the time was devoted to this section of the tour, zigzagging back and forth along the coast, not more than fifty miles inland at any point. The return was made by a great detour over Texas, Louisiana, Arkansas, Oklahoma, Kansas, Missouri, and Illinois, crossing the Mississippi River at Quincy, Illinois. Transportation was by rail, bus, auto and afoot.

Numerous stops were made on the way, especially on the southern Texas coast, wherever new or unusual botanical material or data were expected. River courses and their tributaries were at times followed, particularly the Mississippi below New Orleans as far toward its delta as flood conditions would permit, and the Rio Grande about Brownsville, Texas.

The trip yielded many notes on botanical observations and several hundred herbarium specimens with duplicates. Some special material in Cactaceae and Palmaceae was secured and sent to the Museum's Department of Botany.

No herbarium specimens were taken without a definite purpose in view. Only those were collected that are rare or unusual, that gave promise of uncovering a new species or variety.

In the fall short trips were made by Mr. Benke into the Valparaiso-LaPorte (Indiana) region and the dune region about Michigan City, Indiana. Mr. William F. C. Grams of Desplaines, Illinois, accompanied him. The Fox River valley was revisited in the region from Trout Park Preserve (Elgin, Illinois) northward to the Fox Lake district. The unusually dry season had not affected this territory to any considerable degree. Indeed, when the drought was at its height in the Mississippi valley, in late summer, this was about the only "green spot" on the map of Illinois. These trips yielded a few notes and herbarium specimens.

In the Report for 1929 an account was given of the initiation of activities under the Rockefeller Foundation Fund for Photographing Type Specimens of Plants. This work, planned by Dr. B. E. Dahlgren, Acting Curator of the Department of Botany, and

financed jointly by the Rockefeller Foundation Fund and Field Museum, was begun at the Botanical Garden and Museum, Berlin-Dahlem, in August, 1929, by Assistant Curator J. Francis Macbride, and has been continued there and elsewhere until the present time.

For more than a year the work was carried on at Berlin-Dahlem, where it received the most cordial support of the Director, Dr. Ludwig Diels, of the Assistant Director, Dr. Robert Pilger, and of the curators of the various sections of the herbarium. For the exceptional favors granted to Mr. Macbride in the execution of the photographic work, Field Museum expresses its most sincere appreciation to the director and staff of the Botanical Museum of Berlin-Dahlem.

In all, nearly 9,000 type specimens of plants, chiefly those of South America, have been photographed, the number including all the types in several of the largest families of plants. The herbarium at Berlin-Dahlem offers unequaled opportunities for obtaining photographs of tropical American plants. Being the institution at which the greatest amount of systematic work is done, it possesses an extraordinary number of type specimens, the result of the work of the competent and very active staff. The importance and extent of the herbarium scarcely can be appreciated by one who never has visited it. Its vast collections cover the flora of the whole world, and are international rather than merely national in scope. In thus developing and maintaining them, the German government renders a service of inestimable value to botanical science throughout the world.

Several weeks were spent also at the Botanical Museum of Munich, where Mr. Macbride received the most friendly cooperation from Professor Carl von Goebel, Dr. Hermann Ross, and Professor Karl Suessenguth. The Munich Museum possesses the herbarium assembled by Martius, father of Brazilian botany, and many types in that collection were photographed. Special attention was devoted also to the plants of the family Sapindaceae, since the Munich herbarium contains many of the types in that group described by its monographer, Dr. Ludwig Radlkofer, who died only three years ago.

Later Mr. Macbride proceeded to Geneva, where he was engaged in work at the end of 1930. Through the kindness of the Director, Dr. J. I. Briquet, he has been enabled to photograph many of the types in the famous herbarium of the Botanical Garden maintained by the city of Geneva, and in the unique DeCandolle Herbarium, in the custody of the same institution. Dr. Briquet very generously

supplied the services of an assistant to aid in the photographic work. The herbarium of the Botanical Garden is one of the most celebrated in the world, being particularly valuable because of the great number of types that it contains as the result of the work of many of the very earliest botanists. Its organization speaks volumes for the ability of its director and staff.

Mr. Macbride extended his work also to the rich herbarium of the University of Geneva, where he was welcomed by Dr. Robert Chodat, the well-known monographer of the family Polygalaceae. The university collections, which contain a vast amount of historical material, are noteworthy for the close association that has been developed there between economic and purely scientific material. Dr. Chodat generously placed at Mr. Macbride's disposal the use of the photographic laboratories of the department of botany of the university, thus greatly facilitating the progress of his work.

Field Museum already has received 5,166 negatives of type specimens which are in the Berlin herbarium. Prints have been made from them by the Division of Photography of the Museum and placed on standard sheets in the Herbarium. The photographs have been made with great care, and their superior quality has been commented on by all who have seen them. Details of the leaves and even of the flowers are shown almost as well as in ordinary herbarium specimens, and the photographs, especially when accompanied by fragments of leaves and flowers, are almost as satisfactory for study purposes as the type specimens themselves, which could be consulted only by visiting at great expense the European herbaria in which they are deposited.

The value to an herbarium of such prints scarcely can be estimated. It can be appreciated only by botanists themselves, who have been obliged to spend hours in studying vague Latin descriptions, comparing them with specimens at hand, detail by detail, and trying to guess whether the description really referred to the same species as the specimen under study. With the type photographs before one, usually it is possible to settle the matter at a glance. When these photographs, which will be supplied by Field Museum at the bare cost of making the prints, are available in the principal herbaria of the United States, systematic work will be facilitated immeasurably in respect to tropical American plants.

In the autumn of 1930 the Museum called the attention of the principal herbaria of the United States to the possibility of obtaining these prints. Two complete sets were ordered, and negotiations are

under way for the purchase of sets by other institutions. During the year, 1,387 prints of the type negatives were supplied to the Gray Herbarium of Harvard University, the first institution to order a complete set of them.

As proof of the increasing scientific activity of the Department of Botany as well as of the use being made of the Museum Herbarium and other collections, it is gratifying to be able to cite some of the numerous papers published during the year that have been based wholly or in part on its collections. Most of the papers concerned were prepared by members of the staff, but several others were written by outside botanists who had visited the Museum in order to consult the collections or had borrowed specimens for use in their studies.

One of the most important botanical publications issued by the Museum during the year was *Flora of the Indiana Dunes* by Donald C. Peattie, a pocket-size handbook of 432 pages, with a map and thirty-eight halftone illustrations. It contains brief descriptions of all the ferns and flowering plants known from the sand dune region of the Indiana shore of Lake Michigan, and from the adjacent valley of the Calumet River. The *Flora of the Indiana Dunes* is the only descriptive manual devoted to the Chicago region. It supplies a long-needed manual for distinguishing the many species of plants composing the rich flora of the sand dunes. It will be a useful handbook for many of the nature students who visit the dunes each year in increasing numbers. Since so many of the species growing in the dunes are widespread in the upper Mississippi valley, the volume will be found almost equally useful in most parts of Illinois, Wisconsin, and Michigan.

Professor Samuel J. Record and Mr. Henry Kuylen published in No. 23 of *Tropical Woods* an account of "Santa Marta Valley, Colombia." The article, of fifteen pages, records the observations made by Professor Record during a visit to Santa Marta in January, 1930, and includes an annotated list of the trees of the region. A set of the specimens collected, upon which the tree records are based, is in the Herbarium of Field Museum, and the specimens were determined by Associate Curator Paul C. Standley.

In 1930 Mr. Standley published fifteen papers based wholly or partly upon Museum collections. One of these was a *Flora of Yucatan*, consisting of 336 pages, published as No. 3 of Volume III of the Botanical Series. This work lists all of the species known to exist in the Yucatan Peninsula, a limestone region, geologically and floristically distinct from the rest of Mexico. It is based almost

wholly upon the Museum collections of Yucatan plants, the largest that exist in any herbarium of the world. The *Flora of Yucatan* brings to a close the Museum's botanical work upon the flora of that region, initiated many years ago by the late Dr. C. F. Millspaugh, former Curator of the Department of Botany, who was chiefly responsible for assembling the material on which the report is based. Before his death he had published numerous papers upon Yucatan plants, and his data were used freely in the report issued this year.

Mr. Standley published as No. 1 of Volume VII of the Botanical Series a paper of 175 pages, *The Rubiaceae of Colombia*. This enumerates eighty genera and several hundred species of plants of the coffee family that exist in Colombia. He published, further, as Nos. 1 and 3 of Volume VIII of the same series, *Studies of American Plants—III and IV*. These papers, of seventy-three and 104 pages respectively, describe a large number of new plants, chiefly from South and Central America, found among the collections obtained by Museum expeditions or received for determination from other institutions and from private individuals.

Mr. Standley published in Volume XI of the *Journal of the Arnold Arboretum* a contribution of thirty-two pages enumerating "The Woody Plants of Siguatepeque, Honduras," based upon his field work of 1927-28; and in the same serial appeared another paper by him, entitled "Three New Plants from Yucatan." In the *Journal* there was published also his "A Second Supplement to the Flora of Barro Colorado Island, Panama," a list of eleven pages based upon Field Museum collections.

In *Rhodora* Mr. Standley published a brief paper, "New Forms and Varieties of Indiana Plants." In the various numbers of *Tropical Woods* distributed during the year, he published the following papers: "Notes on Mexican Trees;" "A Second List of the Trees of Honduras;" "*Sickingia Klugei*, a Tree of Panama and Venezuela;" "A New Tree from Colombia;" "A New Inga from British Honduras." The paper upon Honduran trees, covering thirty-three pages, enumerated all the trees known from the Republic of Honduras, and was based upon specimens in the Museum Herbarium.

In association with Dr. William R. Maxon, of the United States National Museum, Mr. Standley published in the *Proceedings of the Biological Society of Washington* a paper of twelve pages devoted to the "Ferns of the Republic of Salvador."

Assistant Curator J. Francis Macbride published as Volume VIII, No. 2, of the Botanical Series a paper of fifty-four pages

entitled *Spermatophytes, Mostly Peruvian—II*. In this there are described many new species of Peruvian plants obtained by the two Marshall Field Botanical Expeditions to Peru. Descriptions of several of the new species that appear in the paper were furnished by members of the staff of the Botanical Museum of Berlin-Dahlem. Mr. Macbride published, also, in No. 24 of *Tropical Woods* a paper entitled "South American *Viburnums* Incorrectly Described as New Species of *Cornus*."

No detailed search has been made through current botanical journals for papers, based wholly or in part upon material in the Museum Herbarium, published by botanists of other institutions. A substantial number of such papers has been published, but there need be mentioned here only a few of them.

In *Rhodora* there appeared an illustrated article by Mr. Hermann C. Benke entitled "*Aster amethystinus* an Obvious Hybrid." This deals with the status of one of the rarest autumn asters of the Chicago region.

Dr. Reinhard Knuth of the Berlin Museum published in the *Repertorium specierum novarum* a paper with the title "Geraniaceae novae." In this appear descriptions of six new species of Peruvian geraniums, whose types are in the Herbarium of Field Museum. Under the authorship of Mr. E. P. Killip, of the United States National Museum, there appeared in the *Journal of the Washington Academy of Sciences* a paper with the title "Ten New Species of Passiflora, Mainly from Colombia and Peru." Two of the Peruvian passion-flowers named were described from Field Museum type specimens.

Two of the three papers by Assistant Curator James B. McNair mentioned in the Annual Report of 1929 (p. 69) were published by the Museum in 1930. They are: *The Differential Analysis of Starches*, Botanical Series Volume IX, No. 1; and *A Study of Some Characteristics of Vegetable Oils*, Botanical Series Volume IX, No. 2. The third, on gums, tannins and resins, was printed in the *American Journal of Botany*, March issue. In addition three other articles written by him have recently been printed. One of these, which appeared in the *American Journal of Botany*, is entitled "The Taxonomic and Climatic Distribution of Oil and Starch in Seeds in Relation to the Physical and Chemical Properties of Both Substances." The others are *Indian Corn* and *Spices and Condiments*, published as Field Museum Botany Leaflets, Nos. 14 and 15 respectively.

The Indian corn leaflet outlines the origin, geographic distribution and varieties of this plant, its use by the American Indian, and modern industrial and experimental products obtained from it. It contains a number of full-page illustrations.

The other leaflet contains descriptions of the various spices included in the case of spices and condiments in the economic exhibits of the Department, as well as some others, and information concerning their source, history, composition, and uses, illustrations of important spice plants and a map of the spice-producing regions of the Old World with the ancient trade and caravan routes. A list of the economic materials comprising various kinds of corn, basketry materials, food products, etc., identified for the Southwest Museum by Mr. McNair appeared in *Southwest Museum Paper No. 4. Archaeological Expeditions in Southern Nevada. Report of the First Sessions Expedition 1929. June 1930.*

Members of the Department staff contributed a number of articles to *Field Museum News*.

The card indexes compiled by Mr. McNair on various subjects mentioned in the Annual Report of 1929 (pp. 69 and 125) have been continued. Additions have been made to his index of economic plants that yield oils, fats, and waxes. New lists of alkaloids and arrow and fish poisons are being compiled by him, as well as a large quantity of manuscript notes on starches, resins, and wood distillation products.

During the year the 600 specimens of resins and gums of the Museum collection were sorted and classified by Mr. McNair in preparation for the exhibits, and in this connection he has prepared for publication a paper dealing with essential oils and resins.

The resources of the staff of the Herbarium have been taxed by the volume of material received during 1930. Its labeling, mounting, and distribution into the Herbarium have required constant attention, but the work has been kept up to date, except for the mounting of specimens.

More than 9,000 specimens of plants, chiefly from tropical America, have been submitted to the Museum for determination by institutions or individuals. Some lots have consisted of only one or two specimens, not infrequently brought to the Herbarium by their collectors, but others have contained hundreds of specimens that demanded detailed study before they could be named. Although part of the specimens had to be returned to the institutions forwarding them, many others were retained for the Museum collections,

and in this manner some of the most valuable of the year's accessions were obtained. A considerable proportion of the collections submitted consisted of plants of the family Rubiaceae, in the study of which Associate Curator Standley has been engaged for the past two years.

Plants were received for identification from every section of the United States, from Massachusetts to Florida, and westward to New Mexico, California, Washington, and Alaska. Among the more distant regions from which material was sent for naming were Switzerland, Germany, Sweden, Union of Socialistic Soviet Republics, Denmark, Hawaii, Mexico, British Honduras, Guatemala, Honduras, Salvador, Costa Rica, Panama, Colombia, Venezuela, Peru, and Cuba.

As stated above, much of the material thus examined consisted of tropical American Rubiaceae, especially from South America. This was directly helpful in Mr. Standley's studies of the family Rubiaceae, and much of it will be cited in papers now in press or in preparation.

One of the most interesting and difficult collections thus studied was formed by the Rubiaceae, Moraceae, and Vochysiaceae collected by Mr. G. H. H. Tate of the American Museum of Natural History during his recent exploration of Mount Duida, Venezuela. This isolated mountain in southern Venezuela resembles in floristic features Mount Roraima, Venezuela, which is famous for the local species restricted to its slopes. Roraima, however, has been visited several times by collectors, and its plants are fairly well known. Mount Duida never had been visited by a botanist, and conditions there approached those visioned sometimes by botanists, who have dreams of discovering a spot whose every plant is a new species. Although the Mount Duida plants studied by Mr. Standley showed obvious affinities with species known from Roraima, practically all were undescribed and there were two plants that represented new genera with exceptionally well-marked distinguishing characters. Manuscript covering the families mentioned has been submitted to Dr. H. A. Gleason of the New York Botanical Garden, who is preparing a complete report upon Mr. Tate's plant collection.

One of the most interesting of the other collections studied consisted of 511 specimens of Rubiaceae collected in Paraná, Brazil, by Per Dusén, and forwarded on loan by Dr. Gunnar Samuelsson of the Royal Museum of Stockholm. The specimens were so prepared that it was a delight to study them. They included complete material

of several species unknown to science, and material of many more that are exceedingly rare in herbaria.

From the Botanical Museum, Berlin-Dahlem, there were received two shipments of Rubiaceae, comprising 1,321 specimens, most of which already have been determined and returned. This collection included recent accumulations of unnamed specimens belonging to this family, and since the Berlin garden has such a wide range of correspondents, the material, although all American, represented a surprisingly large number of collectors and regions. Its determination brought to light a substantial number of new species, as well as material attesting extensions of range for others already described.

The United States National Museum, through Dr. William R. Maxon and Mr. Ellsworth P. Killip, likewise submitted on loan 547 sheets of tropical Rubiaceae, which afforded numerous novelties and many new geographic records. From the Jardin Botanique Principal of Leningrad there were received on loan 419 sheets of the same family. These proved to be of exceptional interest because so many of the specimens were obtained by early collectors, one of those represented being Aublet, who published in 1775 the first account of the plants of French Guiana.

The New York Botanical Garden forwarded on loan sixty-four sheets of Bolivian Rubiaceae, which were determined and returned. The sending contained several types of species described from Bolivia by Dr. H. H. Rusby and not represented in other herbaria. These were of great value in completing an enumeration of the Bolivian Rubiaceae which is now in press.

For study by Dr. Earl E. Sherff there were lent to Field Museum by various European herbaria 840 specimens, chiefly of the genera *Coreopsis* and *Cosmos* and other related groups of the Compositae, with which Dr. Sherff has been engaged lately. This material was received from the Royal Botanic Gardens, Kew, England, the Botanical Museum of Berlin-Dahlem, the Museum of Natural History of Paris, and the Botanical Institute of the University of Florence, Italy.

During 1930 Associate Curator Standley devoted a great deal of time to study of the South American plants of the coffee family, or Rubiaceae, a group whose principal representatives in South America are the species of *Cinchona*, from which quinine is obtained. The work was based in part upon a large series of sheets received on loan from other institutions, but chiefly upon the great numbers of specimens now in the Museum Herbarium. The results were

particularly interesting in the case of the Rubiaceae collected in Peru by Messrs. Llewelyn Williams, Ellsworth P. Killip and A. C. Smith, and G. Klug. Their collections from the eastern slopes of the Peruvian Andes, where little plant collecting had been done previously, yielded a surprising number of new or otherwise noteworthy species.

There was issued at the beginning of the year an enumeration by Mr. Standley of *The Rubiaceae of Colombia*, and similar accounts of the same family as represented in Ecuador and Bolivia are now in press. A report has been prepared upon the Venezuelan Rubiaceae, but it awaits the appearance of a report upon the plants of Mount Duida, so that the numerous new species discovered there may be listed in the full enumeration.

Mr. Standley finished his report upon the plants of the Lancetilla Valley, Honduras, based upon his own collections as represented in the Museum Herbarium, and this is to be issued in January, 1931, as Volume X of the Botanical Series under the title *Flora of the Lancetilla Valley, Honduras*. It will consist of 418 pages, and will contain sixty-eight photogravure plates illustrating some of the prominent plants of the region. The volume is based upon exploration along the northern coast of Honduras, carried out by the author in the winter of 1927–28, and it lists and describes briefly in more or less popular language all the plants collected in the area.

Also prepared by Mr. Standley were two papers describing miscellaneous new plants of various groups, chiefly Central and South American, and these were issued during the year by the Museum. The latter papers were based primarily upon current collections received by the Museum for determination. Some of the most notable of the plants described were from the collections made in British Honduras by Mr. William A. Schipp.

During the year Mr. Standley completed an account of the sedges or Cyperaceae of Central America, and this is now in process of publication. He prepared a descriptive list of the Nyctaginaceae or four o'clock family as represented in Peru, for the forthcoming *Flora of Peru*. At the same time he elaborated an account of the family as it is represented in Colombia, Venezuela, Ecuador, and Bolivia, and the resulting paper is now ready for publication. This particular study was aided by the loan of Andine material from the United States National Museum.

Assistant Curator J. Francis Macbride completed manuscript for a large part of his *Flora of Peru*, and prepared preliminary treat-

ments for the majority of the remaining families. The manuscript for the earlier families of the usual sequence is practically ready for publication, and it is expected that it will be sent to the printer early in 1931. *Flora of Peru*, based on the collections of several Marshall Field Expeditions, will constitute a publication immediately useful to all persons interested in South American plants.

As in previous years, Mr. Hermann C. Benke of Chicago has devoted a substantial amount of time to determining Museum material, especially plants of the Chicago region, and particularly asters and other difficult groups with which he is well acquainted. Dr. Earl E. Sherff, while continuing monographic studies of the genera *Bidens*, *Cosmos*, and *Coreopsis*, likewise has added materially to the value of the Museum collections by his critical annotations of these groups.

The staff of the Herbarium prepared for distribution a large quantity of duplicate material that had accumulated from current collections. During the year 20,739 duplicates, chiefly herbarium specimens, were distributed from the Department of Botany. These were principally South American, mainly from the Williams, Macbride, and Weberbauer collections, and of exceptionally high quality. There were distributed, also, further sets of the Gaumer plants of Yucatan.

The duplicates were sent to most of the important herbaria of the United States and Europe. Several desirable sets of plants have already been received in return for them, and others are expected later. It is through such exchanges that much of the most desirable herbarium material is received by Field Museum. An especially important sending made to the Botanical Museum of Berlin-Dahlem consisted of fragments of type specimens of Field Museum Herbarium, and of selected duplicates representing rare species of the American flora.

Loans of mounted herbarium specimens from the Department in 1930 amounted to 8,557 sheets. The greater part of these, 5,600 sheets, were sent to Berlin-Dahlem for study and determination by Assistant Curator Macbride. The remaining 2,957 sheets were lent for study or determination to a large number of institutions and individuals in the United States and Europe.

Among the more extensive of such loans were 566 specimens of mints or Labiatae, to Dr. Carl Epling, University of California at Los Angeles, who is preparing for publication accounts of the groups represented. To the Missouri Botanical Garden, St. Louis, there

were lent 733 sheets of the genera *Tradescantia* and *Mentzelia*, to be used in preparing monographs on those groups; also 375 specimens of *Frasera*, *Lycium*, and *Menodora*, for the same purpose.

To the United States National Museum there were submitted on loan 255 specimens, chiefly of South American plants, for study by Mr. Ellsworth P. Killip. The New York Botanical Garden received on loan 262 sheets, chiefly of South American plants, to be used in monographic studies by members of the staff. To the Gray Herbarium there were lent 154 specimens of bromeliads, for the convenience of Mr. Lyman B. Smith in preparing an account of the group as it is represented in Peru. To Professor Oakes Ames, Botanical Museum of Harvard University, 345 specimens of Peruvian orchids were lent for the same purpose.

Loans of herbarium specimens by the Museum, although they often require a large amount of clerical work for their preparation, usually result to the great advantage of the Herbarium, because of the critical determinations obtained from those who study the specimens.

As in former years, the Museum has received greatly appreciated assistance from botanists of the United States and Europe in the determination of plants, especially those collected by Museum expeditions. Usually it has been possible to submit duplicate specimens, to be retained by the cooperators to repay in part the labor of making such determinations.

The woody plants gathered by Mr. Herbert Stevens of the William V. Kelley-Roosevelts Expedition to Eastern Asia were submitted to Dr. Alfred Rehder of the Arnold Arboretum, Jamaica Plain, Massachusetts, who with gratifying promptness supplied a list of determinations for them. He described in the *Journal of the Arnold Arboretum* a new rose, *Rosa Stevensii*, collected by the expedition.

Among others who have rendered substantial aid in the determination of material should be mentioned the following: Mr. Edwin B. Bartram, Bushkill, Pennsylvania, who determined various sendings of mosses from current collections; Dr. William Trelease, Urbana, Illinois, who named several lots of plants of the Piperaceae or pepper family; Professor Oakes Ames, of the Botanical Museum of Harvard University, who determined miscellaneous orchid material, and is preparing an account of the orchids for the *Flora of Peru*; Dr. B. L. Robinson, Dr. Ivan M. Johnston, and Mr. Lyman B. Smith of the Gray Herbarium of Harvard University, who have determined speci-

mens of the groups in which they are especially interested; Dr. William R. Maxon, of the United States National Museum, who has determined many ferns, especially those of Peru; Mr. Ellsworth P. Killip, of the same museum, who has determined South American specimens of the passion-flowers, Urticaceae, Boraginaceae, and other groups, particularly those obtained by museum expeditions; Dr. S. F. Blake, of the United States Department of Agriculture, who has identified Compositae; Dr. A. S. Hitchcock and Mrs. Agnes Chase, also of the Department of Agriculture, who have named the grass collections; Dr. H. A. Gleason, of the New York Botanical Garden, who has named many of the melastomes collected by recent expeditions to Peru; Dr. C. L. Shear and Mr. John Stevenson of the United States Department of Agriculture, who have supplied names for difficult specimens of fungi; Dr. C. W. Dodge of the Farlow Herbarium of Harvard University, who has determined tropical American lichens.

Assistant Curator Macbride has been assisted materially by the members of the staff of the Botanical Museum of Berlin-Dahlem in the determination of Peruvian plants, and this assistance is deeply appreciated by the Museum. The critical identifications made by those members of the staff who are engaged in systematic work for the *Pflanzenreich*, the great monograph of the plants of the world being issued by the Berlin Museum, will give the Peruvian specimens an added value for citation purposes in the *Flora of Peru*.

As usual, the Department has been consulted freely by persons desiring information upon botanical matters. Telephone calls from business houses and individuals often bring strange requests for the most heterogeneous information, which is desired for practical application. The assistance of the Librarian of the Department, Miss Edith M. Vincent, has been invoked repeatedly by artists preparing illustrations for encyclopedias or for advertising folders. Specimens of local plants and of plant material often are brought to the Herbarium by their collectors in order to obtain names or information concerning them. Much time has been required, also, to answer requests for information received by mail, covering almost all branches of botanical science. The Department has been called upon frequently for aid in botanical matters by other Departments of the Museum.

The staff of the Herbarium has enjoyed visits from a large number of botanists of the United States and foreign countries. Some have spent only a few hours in the Museum, while passing through Chicago,

but others have devoted a longer period to study of the rapidly expanding collections of the Herbarium.

GEOLOGY.—An expedition to Florissant, Colorado, was conducted by Mr. Bryan Patterson, Assistant in Paleontology. The collecting grounds at this locality occupy the bed of an ancient lake, five miles long and one mile wide, about the shores of which grew, in Miocene times, a varied flora and insect fauna. The flora included all gradations from delicate flowering plants to giant sequoias. Active volcanoes in the vicinity from time to time cast showers of ashes in and about the lake. In the fine-grained muds thus produced, the delicate remains of plants and insects of the period were remarkably well preserved. For collecting purposes, excavations were made by Mr. Patterson at seven different stations in order to obtain as comprehensive a collection as possible. Acknowledgments are due Mr. Singer, owner of the Singer Ranch, and Mr. George Gotham, manager of the ranch, for permission to excavate on that property, and for much other assistance.

Results obtained from the different stations varied considerably in amount, but as a result of the collecting a large and typical series of the fossil insects and plants of the region was secured. The fossil insects collected included flies, true bugs, bees, beetles, ants, crane flies, a perfect butterfly wing and a spider. Among plant remains, a flower of a member of the Convolvulaceae family is of special interest as an example of the preservation of so delicate an object. It belongs to a genus at present restricted to the East Indies. Other plant remains secured were leaves or other parts of poplars, maples, elms, sequoias, and many other trees. Petrified wood of some of the great sequoia trees was also acquired. A feather of a bird contemporaneous with the insects was another interesting object secured. A total of 570 specimens was obtained.

A field trip to the coal mines at Braidwood, Illinois, was made by the entire staff of the paleontological division and 126 specimens of fossil plants were obtained. The fossils which were collected occurred chiefly in concretions and represent plants of the orders of Filicales, Equisetales and Lycopodiales. Some of the concretions were sufficiently large to yield specimens nearly a foot in length.

A field trip to Terre Haute, Indiana, made by Assistant Patterson netted thirty-five specimens of fossil plants. These specimens were chiefly obtained from the Moore mine, near Terre Haute, Indiana, where they occur in shale. Especially fine specimens of *Sphenophyllum* and *Calamocladus* were collected and proved of service in

making reconstructions for the Carboniferous forest group in Ernest R. Graham Hall.

Field trips by Assistant Curator Sharat K. Roy and Assistant Patterson to a section of the Sag Canal, Illinois, yielded twenty-two specimens of fossil worms and three specimens of graptolites.

Two publications of major importance have been issued during the year. The first of these is Volume I, No. 1, of the Geological Memoirs of the Museum, entitled *Studies of Fossil Mammals of South America*. The authors are Professors William B. Scott and William J. Sinclair of Princeton University. This memoir is the first to be published giving the results of studies of the vertebrate fossils collected by the Marshall Field Paleontological Expeditions to Patagonia. Professor Scott describes in this memoir a partial skeleton of the little known fossil mammal, *Homalodontotherium*. Professor Sinclair treats of some fossil marsupials obtained by the expedition. The memoir comprises thirty-nine pages and eight full-page plates.

The second publication issued during the year forms No. 3 of the Museum Technique Series. It is entitled *Restoration of Ancient Bronzes and Cure of Malignant Patina*. Associate Curator Henry W. Nichols is the author and Curator Berthold Laufer of the Department of Anthropology furnishes a foreword. This publication gives the results of several years' experience of the author in the restoration of ancient bronzes, and describes in full the use of the Fink process, by employment of which remarkably successful results have been obtained. The publication comprises fifty pages and ten full-page plates.

A publication describing a marsupial saber-tooth fossil animal from the Pliocene of South America has been prepared in manuscript by Associate Curator Elmer S. Riggs. He also completed manuscript for a guide leaflet on the evolution of the horse and carried on studies of fossil mammals from the Colpodon and Pyrotherium beds of Argentina.

Studies of the Frobisher Bay, Baffin Land, fossils and of the drift fossils of Labrador and Baffin Land, all of which were collected by the Second Rawson-MacMillan Subarctic Expedition of Field Museum (1927), were continued during the year by Assistant Curator Roy. He completed the descriptions of all the brachiopods in the Frobisher Bay collection, and nearly all the trilobites. Photographs to accompany the descriptions have also been made. It is expected that at

least forty new species will be found in the collection as a whole. Fifteen have already been discovered among the brachiopods.

Studies of an unusual Silurian worm collected at Blue Island, Illinois, with the cooperation of the University of Chicago, were made by Mr. Roy and the results of his studies are nearly ready for publication.

All the members of the scientific staff of the Department have contributed articles to *Field Museum News* during the year. Such articles include a brief history of the Museum, and matter descriptive of Museum exhibits, expeditions and other features. A total of twenty-three such articles prepared by members of the Department were published during the year. Copy was also prepared for the geological sections of new editions of the Museum Manual and Museum Guide.

The Curator and Associate Curator, as members of the committees appointed by the National Research Council to plan geological and mining exhibits for the Century of Progress Exposition, attended several meetings of the committees and made written reports to their several chairmen. The Curator addressed the Chicago Women's Aid on the "Activities of Field Museum." Assistant Curator Roy addressed the Geological Club of the University of Chicago on the "Paleozoic Fauna of the Arctic."

Answering of inquiries of correspondents and visitors continued to occupy much of the time of members of the staff during the year. Information was furnished to 563 correspondents and seventy-two visitors. Identification of minerals and fossils for schools and individuals continues to be an important part of this service.

ZOOLOGY.—Six important zoological expeditions were in the field in 1930. Two of these, the Vernay-Lang Kalahari Expedition for Field Museum, and the Second Chancellor-Stuart-Field Museum Expedition (to Aitutaki, Cook Islands), completed their work in 1930, but at the close of the year much of the material collected by them was still in transit. The First Chancellor-Stuart-Field Museum Expedition (to the South Pacific), which began operations in 1929, returned early in 1930, but, as most of its work was accomplished in 1929, the detailed account of its activities will be found in the Report for that year.

Three other expeditions, the Harold White-John Coats Central African Expedition, the Suydam Cutting Expedition to Sikkim, and the Marshall Field Expedition to China were in various stages as



GIANT PANDA

William V. Kelley Hall of Asiatic Mammals. William V. Kelley-Roosevelts Asiatic Expedition

Taxidermy by Julius Friesser. Background by Charles A. Corwin

About one-seventeenth natural size

this is written, the first drawing its work to a close, the second well under way, and the last just getting to its field of operation.

Several private expeditions have reported the collecting of zoological material for Field Museum. Notable is that of Mr. Marshall Field, who obtained several lions for the Museum while on a pleasure trip to Africa. These will be used in a habitat group which has been much desired. Report has been received also from Mr. James E. Baum, Jr., to the effect that he has obtained specimens of large mammals for presentation to the Museum during his personally organized expedition to Persia.

Foremost of zoological expeditions during the year was the Vernay-Lang Kalahari Expedition for Field Museum. This was organized, financed, and participated in by Mr. Arthur S. Vernay, well known for his work in India and elsewhere. The plans of Mr. Vernay were carried out on a large scale and, although Field Museum was the principal beneficiary, material was also collected for the British Museum (Natural History), London, the Transvaal Museum, Pretoria, and the American Museum of Natural History, New York. Mr. Herbert Lang was placed in charge of general management and preparation, his large previous experience in Africa making him especially qualified for this position. Further technical personnel was obtained through cooperation with the Transvaal Museum and the following members of its staff became associated with the expedition: Mr. Austin Roberts, ornithologist; Mr. G. van Son, entomologist and botanist; Mr. V. Fitzsimmons, herpetologist; and Mr. G. Noome, taxidermist. Dr. A. W. Rogers, Director of the Union Geological Survey of South Africa, accompanied the expedition as geologist and contributed much to its success. Mr. Vernay himself completed the field party, and gave his especial attention to large mammals. The complete organization for continuous work consisted of fourteen white men and sixteen natives.

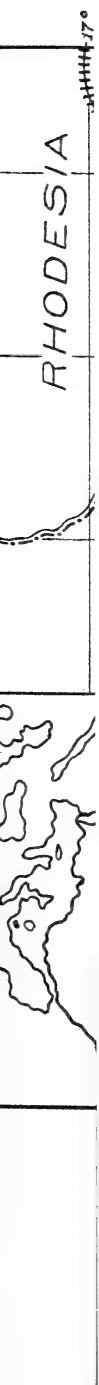
The expedition received the cordial cooperation of the officials of the countries traversed, without whose assistance it could not have carried out its work. Lord Athlone, Governor General of South Africa, extended important aid and good will and took much interest in the expedition. Captain The Honorable B. E. H. Clifford, Imperial Secretary for British South Africa, not only provided numerous indispensable facilities for passage through the country, but also gave invaluable advice in practical matters based on his personal knowledge of conditions gained on his own expedition of 1928. The Resident Commissioner of Bechuanaland, Colonel Rey, gave all

possible assistance. The many courtesies accorded were deeply appreciated by Mr. Vernay and are most gratefully acknowledged by Field Museum.

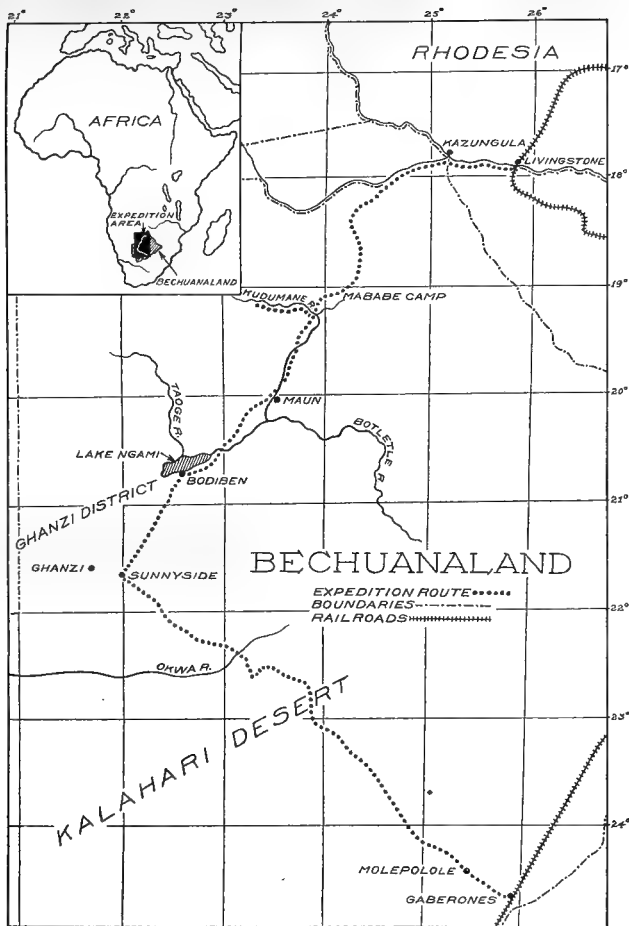
The expedition depended largely upon motor transport, using five one and one-half ton trucks and one six-cylinder passenger car. Much difficulty having been experienced by previous expeditions through scarcity of water and through the frequent puncturing of tires, special precautions were taken to overcome these obstacles. Water tanks were carried on the running boards of all cars, and to one tank on each the radiator was connected to a device by which steam from the radiator was condensed and conserved. This resulted in a running loss of water amounting to no more than 2 per cent. The tires used were the heavy-duty type with special air-container tubes. These covered 5,800 miles, much of it over trackless ground, without a single puncture, a record which seems almost miraculous.

Mr. Vernay sailed from Southampton, England, to Cape Town early in February and went thence to Kroonstadt, arriving March 1. Here a brief preliminary trip was made to the region about twenty miles northeast of Kroonstadt in the Orange Free State. This was for the special purpose of obtaining specimens of the blesbok and black wildebeest, species which are now becoming rare and confined to this area. Excellent specimens of both were secured, as well as a few examples of the springbok. Mr. Vernay then went to Pretoria, and thence to Mafeking, where he proceeded by rail to Gaberones, in southeastern Bechuanaland, which was the base of the main expedition.

At Gaberones motors and other equipment had been assembled, and with everything in readiness the entire party immediately set out March 18, going northwest into the Kalahari Desert at Molepolole and then continuing in a diagonal traverse through the center of the desert to the vicinity of Ghanzi. Leaving the Ghanzi district and the main Kalahari, they worked northward to Lake Ngami which was found to be wholly dry. The next main point was Maun, west of the Botletle River, where conditions were still very dry, but collecting was carried on continuously. Farther north it was expected to work up through swamps by boats, but lack of water prevented this, so a trip was made with porters up the Kudumane River until water was found thirty-five miles from its mouth. Hunting was carried on here for some time, and also in the vicinity of the Mababe Flats.



17°



MAP OF REGION TRAVERSED BY VERNAY-LANG KALAHARI DESERT EXPEDITION

At this point Mr. Vernay proceeded at once to Livingstone, leaving the expedition to work slowly from the Mababe Flats to Kazungula. Here a road was cut south for hunting around Great Makakari where valuable material was obtained. On September 7, the expedition came out to Livingstone and brought its field work to a close.

The broad appreciation of all the possibilities of the expedition for museum purposes shown by Mr. Vernay in planning and organizing it, and his wise choice of personnel, brought well-deserved results. A difficult region was traversed without mishap, and a collection was made which, considering the time spent, is the equal of or superior to any other ever brought out of Africa. Preliminary classification and enumeration of specimens before shipment indicates long series of practically all the large mammals of South Africa, including the following: giraffe, blesbok, springbok, eland, sassaby, steinbok, lechwe, reedbuck, sable antelope, Burchell's zebra, kudu, puku, roan, lion, leopard, brown hyena, wild dog, and aardvark. Of mammals in general, there are 800 specimens of some ninety species; of birds, 1,500 specimens of about 350 species; of reptiles, 2,500 specimens; of fishes, 500 specimens; of lower invertebrates, 1,000 specimens; of insects, 25,000; and of plants, a large collection as yet not recorded by number. A further important result is a complete and detailed photographic record of the expedition which for quality of production and choice of subjects has rarely, if ever, been equaled.

Finally, as a result of this expedition, Field Museum comes into possession of a remarkably fine specimen of the giant sable antelope of Angola. This was obtained through arrangements made by Mr. Vernay with Mr. Allan Chapman, and with the Portuguese Colonial Office and the Governor General of Loanda, to whom grateful acknowledgment is made for permission to take the specimen. The horns of this specimen measure five feet two and one-half inches in length, and it is therefore among the finest of the few examples of this rare antelope preserved for museum purposes.

The Chancellor-Stuart-Field Museum Expedition to Aitutaki, Cook Islands, sponsored and led by Mr. Philip M. Chancellor of Santa Barbara, California, sailed from San Francisco June 11. Mr. Chancellor, accompanied by Mr. Norton Stuart, proceeded to Rarotonga, Cook Islands, and thence by trading schooner to Aitutaki Island, arriving in July. Their object was the collection of the highly colored and greatly varied fishes of the coral reefs, and the photography of reef life in general. They returned in December, bringing

approximately 400 fishes among which are very peculiar types suitable for reproduction and exhibition in the Museum's new Hall of Fishes, now under construction. In addition to this valuable ichthyological collection, the expedition produced some 14,000 feet of motion picture film, partly of undersea scenes taken with a diving bell and special cameras, and partly of various interesting subjects illustrating native life on the island.

The Harold White-John Coats African Expedition of 1930, led by Captain Harold A. White of New York and Major John Coats of London, England, had as its principal object the securing of certain especially rare and desirable African mammals. It also supplemented the results of the Abyssinian expedition of 1929, likewise conducted by Captain White and Major Coats.

Captain White and Major Coats reached Nairobi by airplane early in September and arranged a special hunt for the beautiful but most elusive antelope known as the bongo, a species never obtained by any of the Museum's previous African expeditions. This hunt was made in the Aberdare Mountains in dense humid forests at an elevation of 10,000 feet. After very hard hunting, fortune favored them and they were rewarded with success almost beyond expectations. The following quoted from a letter received from Captain White indicates what took place:

"After one week of hunting twelve hours a day in that terrible forest, an old native tracker brought us into the heart of the bamboo forest where we discovered an old salt lick that his father had told him about and which had been lost to the younger generation. Here, early one morning, we saw a herd of over thirty bongo just entering the forest, and we picked our female and young yearling out of this group. Several days later, after waiting all night at this lick in terrible cold and rain, we shot a large bull just coming down to drink. This animal is a beauty and has a very fine horn measurement of over thirty inches. Later on, we secured another herd bull, making in all four fine large animals and one small young one."

The bongo is unquestionably one of the most difficult to secure of the large mammals of Africa, and Captain White and Major Coats are to be congratulated on their success. Besides the specimens, they had the rare good fortune, doubtless unique, to obtain clear and distinct moving pictures of the live animals in their forest habitat.

Captain White and Major Coats continued hunting in other selected localities and obtained a very fine bull eland and a small



LEAVES AND FLOWERS OF A MUCUNA, A LIANA FROM THE FOREST
ON THE BANKS OF THE TAPAJÓZ RIVER, BRAZIL

Hall of Plant Life (Hall 29)

Collected by the Marshall Field Amazon Expedition, 1929, and reproduced
in the Stanley Field Plant Reproduction Laboratories

One-fourth natural size

baby rhinoceros, both of which were needed for use in the large water hole group for which they collected the principal animals in 1929. At last reports, they were expecting to get specimens of Hunter's antelope, a scarce and localized species not at present represented in Field Museum.

The Suydam Cutting Expedition to Sikkim was organized and sponsored by Mr. C. Suydam Cutting of New York, well known traveler and sportsman, and companion of Messrs. Theodore and Kermit Roosevelt on their recent expeditions for Field Museum. Mr. Cutting spent the summer and early fall of 1930 in the highlands of Sikkim and neighboring parts of Tibet. Associated with him was Mr. Herbert Stevens of Tring, England, who devoted himself to general collecting from fixed camps of smaller mammals, birds, and reptiles, while Mr. Cutting moved about engaged in photography and big game hunting. Under date of October 3, Mr. Cutting wrote from the field, reporting that he had obtained three specimens of the Tibetan Argali sheep (*Ovis ammon hodgsoni*). These were taken in Sikkim near the Tibetan border at an altitude of 17,800 feet. Mr. Cutting returned to New York in December, leaving Mr. Stevens to continue detailed work. Specimens from this expedition will not be received until 1931.

The Marshall Field Expedition to China was just reaching its first field of operation near the close of the year. This expedition is conducted by Mr. Floyd T. Smith, who will be accompanied by a corps of trained native Chinese collectors and who will work in cooperation with Chinese scientific societies. Mr. Smith sailed from the United States in July, and after reaching Shanghai, spent some weeks in establishing relations with Chinese officials and in accumulating and perfecting equipment. On November 29, Mr. Smith, with five Chinese assistants, started up the Yangtze River with the intention of continuing to Suifu and thence up the Min River to Chiatingfu, where it was planned to establish a headquarters for preliminary work. Among immediate objects is that of obtaining a series of specimens and complete material for a habitat group of the peculiar goat antelope known as the takin. Later, detailed general collecting is planned for the district of Mouping, in the province of Szechwan, to obtain typical examples of the many animals discovered there by the French missionary Armand David. Subsequent work will be carried on in southern provinces, especially the province of Kweichow.

Field Museum is much indebted to the Chinese Ministry of Education and to the Academia Sinica of Nanking, through Dr.

T. H. Chien and Dr. Tsai Yuan-pei, for their courteous reception of Mr. Smith and their broad-minded appreciation of the objects of his work.

Curator Wilfred H. Osgood was absent during the spring months, engaged in research at the British Museum (Natural History) in London. This work was especially in connection with the classification of mammals obtained by the William V. Kelley-Roosevelts Expedition in China and Indo-China. Certain unidentified mammals from other expeditions were also studied and notes made for use in the preparation of publications previously undertaken. A further result was the acquisition of a share of a large unstudied collection of mammals from French Indo-China which was submitted to Dr. Osgood for determination by the joint action of the British Museum and the French naturalist, M. Jean Delacour, whose expedition made the collection.

Associate Curator C. E. Hellmayr also spent several months abroad, mainly in London, but also in various continental cities where he examined historic specimens of birds and carried on research in which all matters of uncertainty were settled for the completion of his forthcoming work, *The Birds of Chile*. He also made important studies for use in continuation of the series of books issuing under the title *Birds of the Americas*.

Dr. Hellmayr published in *Alauda*, a French ornithological periodical, a paper entitled "Louis Bose, Ornithologue Oublié," and in *Novitates Zoologicae* a short paper entitled "On Two Undescribed Neotropical Birds."

Colin C. Sanborn, Assistant in Mammalogy, completed a study of the large collection of South Sea bats made by the Cornelius Crane Pacific Expedition. While at work on this, he received further collections from the same region submitted by the Museum of Comparative Zoology of Harvard University and the American Museum of Natural History, the last of these being the extensive series obtained by the Whitney South Sea Expedition. He has, therefore, prepared a combined report on all three collections.

Mr. Sanborn published in *American Museum Novitates*, No. 435, a paper entitled "Two New Fruit Bats Collected by the Whitney South Sea Expedition," and in the *Journal of Mammalogy* (Vol. XI, pp. 61-68) one on "Distribution and Habits of the Three-banded Armadillo (*Tolypeutes*)."

Assistant Curator Karl P. Schmidt continued research on the local fauna during 1930, to complete the series of descriptive leaflets dealing with the amphibians and reptiles of the Chicago area.

A Museum leaflet by Mr. Schmidt on *The Salamanders of the Chicago Area*, illustrated with three black and white plates and one colored plate, was finished and published early in the year.

The manuscript for a leaflet on the turtles, the third of the series, was completed by Mr. Schmidt. He also finished a study of the small but unusually interesting collection of reptiles secured in north Arabia by Mr. Henry Field in the course of the Marshall Field North Arabian Desert Expeditions of 1927-28. The results of this study were issued in the Museum's Zoological Series of publications. Further progress was made in the study and identification of the collections of reptiles made by the Cornelius Crane Pacific Expedition and the William V. Kelley-Roosevelts Expedition.

Mr. Schmidt published (jointly with Mr. Charles E. Burt) a paper entitled "Description of *Emoia sanfordi*, a New Lizard from the Islands of the Western Pacific" in *American Museum Novitates*, No. 436. He also contributed an "Essay on the Zoogeography of the Pacific Islands," which appeared in *Jungle Islands*, the book on the Crane Pacific Expedition published by G. P. Putnam's Sons.

An important report on the *Birds of the Marshall Field Peruvian Expedition, 1922-1923*, by Assistant Curator John T. Zimmer, was published. Included are the descriptions of six new birds discovered by this expedition, others having been named in several preliminary papers. The report covers 247 pages and forms a valuable contribution to knowledge of the birds of South America.

A special publication was issued November 17, 1930, under the title *Album of Abyssinian Birds and Mammals*. This was in the form of a portfolio of colored lithographic reproductions of paintings made by Louis Agassiz Fuertes while a member of the Field Museum-Chicago Daily News Abyssinian Expedition of 1926-27. Included are four studies of mammals and twenty-eight of birds, among which are many of the finest and most characteristic species of Abyssinia. A brief descriptive text accompanies the plates. The publication of this portfolio was made possible by a generous donation from Mr. C. Suydam Cutting, who was also a member of the expedition on which the original paintings were made. These paintings, 108 in number, were purchased by Mr. Cutting after the artist's untimely death and presented to the Museum. From this collection, thirty-two of the finest have been selected and reproduced by offset lithography.

A large number of articles were contributed to *Field Museum News* by members of the Department staff.

The following list indicates the various expeditions and other field work conducted during 1930 for all Departments of the Museum:

LOCALITY	COLLECTORS	MATERIAL
KISH, MESOPOTAMIA (Eighth season)	L. C. Watelin René Watelin I. Martel	Archaeological collections
NIGERIA, WEST AFRICA	W. D. Hambly	Ethnological collections
COLORADO	Paul S. Martin	Archaeological collections
EUROPE	Henry Field	Anthropological collections
PERU	Llewelyn Williams	Botanical collections
EUROPE	J. Francis Macbride	Photographs of botanical type specimens
COLORADO	Bryan Patterson	Paleontological collections
ILLINOIS (Braidwood)	Elmer S. Riggs and assistants	Paleontological collections
INDIANA	Bryan Patterson	Paleontological collections
ILLINOIS (Sag Canal)	Bryan Patterson	Paleontological collections
ILLINOIS (Sag Canal)	Sharat K. Roy Bryan Patterson	Paleontological collections
BECHUANALAND (Kalahari Desert)	Arthur S. Vernay Herbert Lang Dr. A. W. Rogers Austin Roberts G. van Son V. Fitzsimmons G. Noome	Zoological collections
EAST CENTRAL AFRICA (Kenya, Uganda, Congo)	Captain Harold A. White Major John Coats	Zoological collections
SIKKIM, INDIA	C. Suydam Cutting Herbert Stevens	Zoological collections
SZECHWAN, CHINA	Floyd T. Smith	Zoological collections
NEW ZEALAND, AUSTRALIA AND EAST INDIES	Philip M. Chancellor Norton Stuart	Zoological collections
AITUTAKI, COOK ISLANDS	Philip M. Chancellor Norton Stuart	Zoological collections

Leader of expedition named first in each case.

ACCESSIONS

ANTHROPOLOGY.—The number of new accessions received and recorded during 1930 was fifty-eight. Of these, forty-five are by gift, five as the result of expeditions, two by exchange, and six by purchase. These accessions aggregate a total of more than 3,271 objects.

Two hundred and nineteen objects were brought back by Assistant Curator Paul S. Martin as the result of the Field Museum Archaeological Expedition to the Southwest (Rosenwald Fund). This collection consists of decorated pottery, stone and bone tools, and some potsherds for study purposes.

The pottery decorated with designs painted in black on white is in splendid condition. It is entirely different from any the Museum previously possessed, and will make an attractive exhibit. Two examples of this Pueblo pottery, corresponding to the early Mesa Verde type, are illustrated in Plate XXXIV of this Report. Dr. Martin also brought back some prehistoric roof logs from the rings of which approximate dates for the buildings may be computed.

Mr. Burridge D. Butler, publisher of *The Prairie Farmer*, presented to the Museum six excellent Navaho blankets from his collections made during the past twenty years. These blankets are old and especially valuable because they are colored with native dyes. The designs typify the older Indian style.

The Museum acquired as a result of a purchase made with part of the income of a fund provided by Julius Rosenwald and the late Augusta N. Rosenwald, a fine collection of silver ornaments made by Navaho Indians and a set of their silversmiths' tools. This acquisition illustrates the high type of handiwork these artisans achieved, and with other material on hand made possible the installation of a representative exhibit of Navaho silver jewelry.

Two prehistoric coiled cooking pots found in the Chaco Canyon, Arizona, were presented by Mr. J. W. Young, of Chicago.

Mr. Frank von Drasek of Cicero, Illinois, contributed a number of arrow- and spearheads from Magnet Cove, Arkansas. These specimens are valuable in that they come from the burial mounds of that area.

Mr. Llewelyn Williams, Assistant in Wood Technology, turned over to the Department a small ethnological collection made by him during the year he spent on the upper Amazon as leader of the Peruvian Division of the Marshall Field Botanical Expedition to the Amazon. From the Yahua Indians, who live along the lower Peruvian Amazon, he obtained a series of skirts, armlets, leg ornaments, and headbands, all made of dry grass, as well as hunting equipment consisting of a blowgun, a bundle of darts for the blowgun tipped with the deadly curari poison, and the quiver in which the darts are kept while hunting. From the Campas Indians of the

Ucayali District of Peru Mr. Williams secured several pieces of excellent pottery. These are finely decorated with delicate lines, either incised or painted in red, brown, and black on a creamy white background. The whole surface is covered with a bright varnish obtained from a tree resin.

Dr. Ralph M. Whitehead, of New York, collected and presented to the Museum three ear ornaments made of the metal-like wings of a giant wood-boring beetle, and ornamented with toucan feathers. These are worn by the Aguaruna Indians of the Amazon valley, a branch of the Jivaro. From the same tribe Dr. Whitehead also obtained a very finely made comb, a bark-cloth shirt, and a well-woven cotton bag.

Mr. J. A. Skelton, of San Salvador, transmitted to the Museum, through the good offices of Mr. Gilbert H. Scribner, of Chicago, two very interesting stone objects excavated by him in El Salvador. One of these is a crude stone statuette which bears a very close resemblance to the so-called archaic statues of the Finca Arevalo, close to Guatemala City. The statuette presented by Mr. Skelton may be assigned with a high degree of certainty to this early culture, which preceded the Maya, and may perhaps be attributed to the Chorotegans. The other object is a well made stone ring, the top of which is carved in the shape of a realistic frog, the Central American symbol for rain.

Three or four years ago an expedition of the Carnegie Institution, Washington, D.C., under the leadership of Mr. Oliver G. Ricketson, Jr., uncovered at Uaxactun, in the heart of the forest-clad Peten region of Guatemala, an exceptionally interesting pyramid. This is a structure covered with stucco, which owes its preservation to the fact that at a later period another pyramid had been built over and around it by the Maya inhabitants of Uaxactun. A scale model of this pyramid, the work of Mr. Samuel Guernsey of Cambridge, Massachusetts, has been purchased, and is now on exhibition in Hall 8. The model is of exceptional interest because it represents the earliest known pyramid of the Maya area, and possibly of the entire New World. On each side stairways flanked by huge grotesque masks ascend to the flat summit, and the character of the whole structure differs from any other Maya monuments. Indeed, it is probable that it was erected by people possessing a culture which preceded that of the Mayas, although its builders may well have spoken a Maya language.

Two remarkable craters (pottery vessels in which wine was mixed with water), made at Paestum in southern Italy in imitation of Greek red-figured vases, were presented by Mr. Thomas S. Hughes, of Chicago. One of these vases is painted with a bacchanalian scene which represents the Greek god of wine, Dionysos, holding his drinking-cup out to Selinos who stands in front of him, torch in hand. The other vase is a calix crater, imitating in shape the type of drinking-cup known as calix. It is decorated with two paintings, one showing a warrior clad in the short Italic tunic and holding a white horse; the other representing a man with staff, clad in a toga. The date of these two craters is the first half of the fourth century B.C.

To Mr. L. M. Willis of Chicago the Museum is indebted for an unusually large and beautiful glass amphora found in the ancient city of Pompeii in a perfect state of preservation. This vase is the more valuable as the original bronze tripod stand in which it is set is preserved with it.

As a result of the excavations carried on at Kish during the last season by the Field Museum-Oxford University Joint Expedition to Mesopotamia, a vast amount of material was received. Outstanding are sixty complete pieces of pottery, a large quantity of pottery sherds, numerous clay figurines and flints, as well as many objects of shell, bone, and metal, and a great number of skulls. A fine bronze beaker of graceful outlines, discovered at Kish and restored in the Department's repair shop this year, is illustrated in Plate XXXVIII of this Report.

Professor Stephen Langdon, director of the expedition, presented a reproduction of a painted Sumerian clay head. The original was discovered at Kish above the red stratum in a level where pictographic tablets of the Jemdet Nasr type were also found. It was retained by the Museum of Bagdad. This head now presents the best evidence for studying the type of the real Sumerian or proto-Sumerian of the earliest accessible period. It is the only portrait sculpture modeled with the hair and skin indicated in colors. The hair left on the crown by the tonsure of the period and the full beard without mustache are black; the skin is a pale yellow; the irises, eyebrows, and eyelashes are black. The torso of this statuette has unfortunately not been recovered.

Six Babylonian clay tablets, each provided with a translation, were received as a gift from Mr. Henry J. Patten, Chicago.

The Haskell Museum at the Oriental Institute of the University of Chicago obligingly placed at the Museum's disposal fourteen

predynastic pottery jars from Egypt which were used in the installation of a predynastic burial.

During the year the Museum was made the beneficiary of a valuable gift of Bushman material collected by Mr. Arthur S. Vernay, of New York and London, while in Africa conducting the Vernay-Lang Kalahari Expedition for Field Museum. This collection is completely representative of the simple hunting culture of the nomadic Bushmen, perhaps the most primitive of all primitives, against whom other tribes, along with European settlers, have constantly waged war. The parts of the Kalahari Desert where this collection was obtained are difficult of access; this material therefore represents Bushman culture in a form unaffected by foreign influence. The quivers and poisoned arrows are the best of their kind, while a series of bows will make an interesting exhibit. The Bushmen are skillful at making personal ornaments of ostrich eggshell beads threaded to form long loop necklaces, girdles, and headbands. The examples presented by Mr. Vernay are the finest now obtainable. An engraved ostrich egg, some neatly beaded aprons, and a string bag complete this excellent series. Anatomical material is difficult to obtain from the Bushmen; therefore the receipt with this collection of a skull in good state of preservation is particularly appreciated.

The collections made in West Africa by Assistant Curator W. D. Hambly as leader of the Frederick H. Rawson-Field Museum Ethnological Expedition to West Africa, 1929-30, comprise more than 2,000 objects. Of these, 1,200 come from Angola and the remainder from Nigeria. The material from Angola represents with a fair degree of completeness the life and industries of the Ovimbundu of the central highlands, the VaKuanyama of the south, and the VaChokue of the east. Of these objects the greater number were obtained from the Ovimbundu, whose iron work, wood carving, basketry, pottery, hunting, and agriculture are fully represented. All crafts were studied carefully, and a series of objects was obtained in order to give a clear idea of the various stages of the processes. The masks and costumes of eastern Angola are particularly interesting in their bearing on the initiation ceremonies for boys. Among the carved wooden objects from the Ovimbundu are a large number of well done human figures, chiefs' staffs, tobacco pipes, and snuffboxes.

From Nigeria there are articles illustrating the process of glass-making, and leather work, brass work, basketry, and mats. The most valuable ceremonial objects are wooden masks from Ife used in a



RESTORATION OF A GROUP OF THE EXTINCT THREE-TOED HORSE (*Mesohippus*)

Ernest R. Graham Hall (Hall 38)

Gift of Ernest R. Graham. Frederick Blaschke, Sculptor

ceremony purporting to show a return of deceased people of great importance. The Buduma of Lake Chad yielded a series of objects illustrating every activity of these people, who were heretofore but little studied or represented in museums. Brass work from Benin is of particular interest in that there is a whole series of objects demonstrating the process of casting in clay molds.

A gift from Mrs. William G. Burt of Evanston includes several welcome additions to the Museum's West African collections. A wooden mask and a fiber costume from Sierra Leone are valuable because of their association with a secret society, and such material is exceedingly difficult to obtain. Two well carved wooden paddles are probably from the Jekri or Sobo people of Sapele in southern Nigeria. The fact that these objects were obtained about thirty years ago adds to their value, for they show no trace of European influence such as is affecting African craftsmanship at the present time.

Forty articles, collected in Angola forty years ago, are a gift from the Rev. H. A. Cotton, of Warrensburg, Illinois. Conditions have greatly changed in Angola since Mr. Cotton resided there as a missionary, and the objects are useful in showing persistence of basket designs and other types of industry over a long period. The ornamental clubs show the best workmanship of the Ovimbundu, and are a very welcome addition to the Museum's collections from this tribe. A leather pouch is of fine quality, and there is a pair of wooden shackles such as were worn by slaves half a century ago.

A very fine alabaster model of the famed Taj Mahal at Agra, India, skillfully made by a native artist of that city, has been contributed by Mr. Sidney Weiss of Chicago.

A gilt bronze statuette of a standing Buddha was donated by Mr. Lee Ling Yün in memory of his father, Lee Wan Ching, well known in Shanghai and in this country, who died in Chicago in November, 1929. This image, of high artistic quality, is of the type of the so-called "sandalwood Buddha," which was the first Buddha statue that came to China, and was made of precious sandalwood. It is a production of the Ming period (A.D. 1368-1643).

From the fund annually voted to the Museum by the American Friends of China, Chicago, for the increase of Chinese material, the following five acquisitions were made this year:

(1) A rare old Chinese painting formerly in the possession of Marquis Tokugawa of Tokyo and attributed in Japan to Li An-chung, an artist of the Sung period, who lived in the twelfth century. It

represents in spirited action a cockfight, forty-six figures being dramatically grouped around the cockpit, where two powerful roosters hold the stage, one pursuing the other which seeks safety in flight.

(2) A rhinoceros horn of the Indian species, carved all around in high relief with a row of curious animals among which a giraffe is conspicuous. It is a work of the fifteenth century.

(3) A large prehistoric pottery jar, decorated with spiral patterns painted in black, brown, and yellow, of the neolithic period (about 2,000 B.C.). It is the first example of this kind of pottery in the Museum, and is especially valuable for comparison with the corresponding painted ceramics of Jemdet Nasr and Kish.

(4) A unique gilt bronze figurine of a well modeled crouching two-horned rhinoceros with scaly armor, from about the third century A.D.

(5) A white porcelain jar of the Yung-cheng period (1723-35) decorated with colored paintings, in enamel, which represent fishermen variously engaged, especially with fishing cormorants.

These five objects were carefully selected by the Curator, not merely on account of their distinct artistic or antiquarian merit, but because each offers a decidedly scientific interest and bears upon a specific problem that he is studying.

Mrs. William H. Moore of New York, who has manifested her interest in the Museum's jade collection on several previous occasions, in 1930 presented three outstanding jade objects of the eighteenth century: a superb green jade brush-holder of cylindrical shape carved all around with an elaborate landscape in high and undercut relief, presumably the largest and finest of its kind; a twin vase of the very rare yellow jade decorated with representations of pine, prunus, and five bats symbolizing five kinds of blessings; and a rare black jade dish in the form of a shell to which smaller shells and a lotus stem with two crabs are joined, all carved out of the same block.

Five important objects of Chinese jade were presented to the Museum by Mr. R. T. Crane, Jr., a Trustee of the Museum. One of these is a ceremonial battle-ax carved from a grayish white jade. It is beautifully ornamented on both sides with conventionalized monster heads of archaic style, which are symbolic of attack. The period and significance of this ceremonial weapon are revealed by an inscription of eight characters in ancient style, four on the obverse and four on the reverse. This inscription reads, "Made by order of the Great Sung dynasty and bestowed upon the President of the

Board of War." This jade ax is a product of the imperial workshops, and was conferred by the emperor on the minister of war as a badge of office and emblem of power.

Jade slabs were used in ancient China as writing material, and documents carved in such slabs were united into books. A jade slab presented by Mr. Crane is engraved with a pair of rampant five-clawed dragons soaring in clouds and striving for a flaming pearl. An island emerges from the ocean waves below. The center is occupied by the title of the book, which reads, *A Dissertation on Talents and Virtues with Reference to the Counsels of Kao Yao—an Imperial Essay*. It is written by the Emperor K'ien-lung. Kao Yao was minister of justice in ancient times, and is still regarded as the model for all administration of law. His wise counsels form a chapter of the *Shu king*, the oldest historical book of China.

In earliest times carvings of jade were buried with the dead in the belief that this stone, regarded as the most precious jewel and as embodying the quintessence of nature, would have the tendency to preserve the body from decay and to promote its resurrection. Small figures of animals delicately carved from jade were attached to the shroud. Three very fine and rare examples of this type from the early archaic period—an elk, an ox-head, and a fish-monster—are included in the gift of Mr. Crane.

Mrs. George T. Smith of Chicago, who has contributed so much to the Museum's jade collection, added to it this year two exquisite objects—a white translucent jade dish of the K'ien-lung period (1736-95) in the shape of a lotus leaf with a dragon fly resting on it, and a jade carving of a recumbent lion-like monster in the act of devouring two snakes, of so-called Scythian style (T'ang period, A.D. 618-906). Mr. A. W. Bahr, of New York, in memory of his deceased brother, presented a decorated jade ring of the late Chou period (about third century B.C.), and a notched disk and a small ox-head of the Han period (about second century B.C.). Another gift of Mr. Bahr's, which is of intense scientific interest, is the plastron of a turtle inscribed in the earliest extant form of Chinese characters and used for purposes of divination (about 1,500 B.C.).

A Chinese metal mirror of highly artistic quality, made in the seventh or eighth century A.D. under the T'ang dynasty, is the gift of Mrs. Charles H. Schweppe of Chicago. It is decorated with a scene wrought in high relief, which depicts ancient Chinese notions of the moon. The center of the ornamented surface is occupied by a large tree, the sacred cassia, which was believed to make the human

body immortal. Beneath the cassia is a hare pounding in a mortar herbs that will form the ingredients in an elixir of eternal life. The hare in the moon is an old mythical concept both in ancient India and China. To the left of the hare is another inhabitant of the moon, a supernatural long-lived toad believed to grow horns at the age of three thousand years and to cause eclipses of the moon by swallowing it. A dragon and a phoenix are also represented on the mirror.

Two mortuary clay figures of horsewomen engaged in a polo match were presented by Mr. David Weber of Chicago. They are artistically modeled, and delicately painted in colors. Headstalls, bridles, and croups of the horses are finely outlined in ink over a layer of white pipe-clay. The polo horses of ancient China were of the Persian breed and were imported from Khotan in Turkestan. The game was eagerly played by the emperors of the T'ang dynasty as well as by officials and ladies of high rank. Such clay figures were interred in the graves of sport-loving dignitaries for the purpose of contributing to their entertainment in the future life, and are the earliest representations of polo now extant. Together with the two polo figures of a different style, presented last year by Mr. Earle H. Reynolds, of Chicago, they form important documents for tracing the early history of the game.

Mr. William B. Greenlee of Chicago presented an iron knife with carved ivory handle from Nepal, a gilt bronze statuette of Buddha from Siam, an old Chinese opium pipe of ivory, and a Roman pottery lamp with designs in relief. The opium pipe is engraved with the pictures of the Eight Immortals and bears this inscription: "May you be promoted in office by three grades! May the odor and taste of this pipe lead you to joy and to the pure incense of the Fairies of the Eight Grottoes!"

Six very interesting cast brass figures from Borneo were received as a gift from Mr. N. M. Heeramaneck, of New York. Three of these represent crocodiles with open jaws and scaly bodies. The crocodile is worshiped by the natives of Borneo as a human ancestor who is capable of assuming animal shape, and it plays a prominent role in both their mythology and decorative art. Another crocodile figure carries a man astride its neck with an animal in front of him, and another creature on the crocodile's back—evidently the record of a legendary tale. The most interesting of these brasses represents a ceremonial bull-fight. Two combatant bulls are facing each other with heads lowered, trying to gore each other with their horns, each



NORTHERN SEA-LION

Hall of Marine Mammals (Hall N)

Taxidermy by C. J. Albrecht. Background by Charles A. Corwin

About one thirty-second natural size

spurred on by a man standing behind, who wears the conical hat so characteristic of Borneo.

BOTANY.—In 1930 the Department of Botany received 48,912 specimens, a substantial increase over the number for the preceding year. The scientific value of these, as well as the quantity, was greater. The number of accessions was 260, representing 115 individuals and organizations. Of the specimens accessioned, 2,271 were study samples and exhibition material of woods, 452 represented economic material for exhibition purposes or for the study series, and the remainder, 46,189 specimens, were herbarium specimens, photographic prints of plants, and negatives of type specimens.

Of the total number of specimens accessioned, 3,660 were presented by correspondents of the Museum, 11,563 were received in exchange, 6,995 were purchased, 20,907 were acquired as the result of Museum expeditions, and 5,787 came from miscellaneous sources.

The most important addition to the herbarium collections was the large number of specimens from Peru, received through a Museum expedition, by exchange, and by purchase. This material arrived at an opportune time, early enough to be cited in the *Flora of Peru*, in course of preparation by Assistant Curator J. Francis Macbride, and now, in part, ready for publication.

The most valuable of the Peruvian collections received consisted of 13,000 specimens obtained by Mr. Llewelyn Williams in eastern Peru. These are in addition to 9,500 specimens from the same region received from Mr. Williams in 1929. His complete series, representing more than 8,200 collection numbers with 2,154 wood specimens, is doubtless the most comprehensive one ever obtained in Peru, and of the greatest scientific value. A complete set of the herbarium specimens has been mounted and is now being studied and determined. The Rubiaceae, one of the largest families of Peru, already have been named, and they were found to be extraordinarily rich in new species. When named, the large number of duplicates will be distributed to other institutions.

From the United States National Museum there were received in exchange 3,481 Peruvian specimens, collected by Mr. Ellsworth P. Killip and Mr. A. C. Smith in central and eastern Peru in 1929, during an expedition conducted by the Smithsonian Institution. Messrs. Killip and Smith traveled through the region visited by Mr. Williams, but they collected also in other parts of Peru, and the two large series do not duplicate each other as much as might be expected.

When combined, the two afford the first large representation ever assembled of the rich flora of the eastern slopes of the Peruvian Andes.

The 4,137 specimens mentioned elsewhere as transmitted in exchange by the Botanical Museum of Berlin-Dahlem, include a large number of Peruvian species represented by fragments of type specimens and other specimens of historic interest.

The Museum was fortunate in being able to purchase from Dr. August Weberbauer 1,686 specimens that he had collected in various parts of Peru. These supplement admirably the large series of Dr. Weberbauer's plants already in the Herbarium, and supply authentic material of many of the new species described from his collections.

There were purchased also 1,460 specimens collected in the region of Iquitos, Peru, by Mr. G. Klug. Although these were gathered in an area visited by the Field Museum expedition and by that of the United States National Museum, they include numerous species not represented in the other collections.

From Mr. Carlos O. Schunke of La Merced, Peru, there were purchased 720 specimens. These were obtained in the Chanchamayo valley, which already had become famous for the exceptionally interesting plants that it has yielded. Mr. Schunke's latest series shows that the botanical possibilities of the valley have not yet been exhausted.

The Museum Herbarium now contains more than 25,000 sheets of Peruvian plants, undoubtedly the most complete representation of the flora of that country that exists in any herbarium in the world. Through the courtesy of the director of the Berlin herbarium, there have been obtained fragments of many of the rarer species recorded from Peru and not otherwise represented in the United States. As a result, the Museum Herbarium possesses some representation of almost every species recorded from Peru and, of course, material of a very large number of species not represented in other American herbaria.

From other parts of South America, also, large amounts of study material have been acquired during the year. Most of these have been obtained by purchase, and purchases of herbarium specimens have been restricted chiefly to collections from South American countries.

From the Jardin Botanique Principal, Leningrad, U.S.S.R., there were received in exchange 397 plants, mostly from Colombia and Mexico, collected by Dr. G. Woronow and Dr. S. Juzepczuk in the course of their exploration of those countries in 1926. The majority

of these specimens were determined in the Department of Botany, and several of them, especially those from the little-known Caquetá valley of Colombia, were found to represent undescribed species.

The British Museum (Natural History), London, sent in exchange 137 specimens from Colombia, Venezuela, and Ecuador, collected almost a hundred years ago by the famous collectors Linden and Jameson, and consequently of great historical and scientific value. The Royal Botanic Gardens, Kew, England, transmitted in exchange twenty-two valuable specimens, chiefly type material of South American plants of the coffee family.

Mr. Edward H. Graham, Pittsburgh, Pennsylvania, presented thirteen specimens of the same family that he had collected in Venezuela. From Professor Henri Pittier, Caracas, Venezuela, whose recent work has added so much to the knowledge of the Venezuelan flora, there were acquired by purchase 475 specimens of plants collected by himself and Mr. W. Gehriger. From Mr. José Saer d'Héquert there were purchased 224 specimens that he had collected in the same country.

Several lots of Brazilian plants were received, the most important being a purchase of 510 sheets from the state of Paraná, collected by the late Per Dusén. The Dusén specimens are pre-eminent in quality, their colors being preserved in almost natural brilliance, a most unusual condition in the case of tropical plant specimens.

From Mr. E. H. Snethlage, Berlin, there were purchased 235 Brazilian plants. The Gray Herbarium of Harvard University sent in continuation of exchanges sixty-nine desirable specimens, chiefly of plants obtained recently in Brazil by Mr. Lyman B. Smith. Mr. Emilio Kauffmann of Pará, Brazil, presented four specimens of Brazilian plants, one of them illustrating by excellently preserved material the Brazilian *Ravenala*, the only American relative of the traveler's tree of Madagascar.

There was purchased a single collection of Uruguay plants, consisting of seventy-seven specimens, from the well-known collector, Dr. Guillermo Herter, of Montevideo. From Mr. Pedro Jorgensen, of Villarrica, Paraguay, there were purchased 100 specimens assembled as the result of his field work in Paraguay.

The Museum's Argentine collections were increased, through purchase, by 100 specimens collected in southern Argentina by Dr. Arturo Donat of Tehuelches, and 100 specimens collected by Mr. Erik Ammann. In the same manner there were acquired 300 specimens of Chilean plants, from the collections of Dr. K. Behn.

After the collections received through the Museum's own expedition, the most important accession of the year consisted of 4,137 specimens received in exchange from the Botanical Garden and Museum of Berlin-Dahlem, Germany. The several sendings consist principally of fragmentary specimens, but they are of the highest value because they were taken from type specimens or from sheets authentically named by the numerous specialists of the Berlin herbarium. It is difficult to express adequately the Museum's appreciation of the courtesy thus extended by the Director, Dr. Ludwig Diels, in permitting the deposit in America of so large an amount of historically valuable material, which will facilitate immeasurably the study in this country of South American plants. Special thanks are due also to the curators of the Berlin Museum, who assisted in assembling the material.

These collections from Berlin supplement the photographs of type specimens obtained during the past two years, and with their assistance it will be possible to understand the described species of plants almost as if the type specimens themselves were under observation. Nearly all the specimens thus received are South American, particularly Peruvian, and they give to the United States a representation of probably 2,000 species not previously accessible in American herbaria.

From the United States National Museum there were received in exchange during the year 4,158 specimens of plants. Most of these were Peruvian, and already have been mentioned. The sendings also included material from various other parts of South America and from Mexico. They included many plants of the family Rubiaceae, most of which were submitted for determination, and they were especially welcome as an aid to the studies of that family now being made by Associate Curator Paul C. Standley. The exchanges forwarded by the National Museum constituted a highly important addition to the Herbarium of Field Museum.

In Mexico and Central America there has been less botanical activity than in other recent years, but the Museum's collections were increased by a substantial number of specimens from these regions which still are so imperfectly known, in spite of the vast amount of time already devoted to their exploration. From the Universitetets Botaniske Museum, Copenhagen, through Dr. Carl Christensen, there were received in exchange 593 specimens from Mexico and Central America. These were obtained almost a hundred years ago by F. M. Liebmann, the most diligent of the earlier collectors in Mexico, and by A. S. Oersted, who was probably the first

collector to visit Costa Rica and several other parts of Central America. It is remarkable that portions of such important collections should have remained so long unnamed. The specimens received were determined in the Museum by Mr. Standley, and several proved to be new species that had escaped later visitors to the same regions.

From the United States National Museum there was received in exchange a valuable sending of 144 photographs of type specimens, representing plants of the Rubiaceae, or coffee family. Mr. George L. Fisher presented 193 plant specimens collected in Mexico and Texas, which were determined by the Department of Botany.

The most interesting lot of Central American plants that arrived during the year consisted of 311 specimens presented by Mr. William A. Schipp of Belize, and collected in central British Honduras. The collections made by Mr. Schipp during the past two years have given a far better idea of the British Honduran flora than any previous ones. They prove that the flora is unexpectedly rich in new species, many of which have unexpected affinities with South American and West Indian plants. Mr. Schipp's most recent sending contained a larger number of *Utricularias* or bladderworts than had been known previously to exist in the whole Central American region.

From Mr. C. L. Lundell of Dallas, Texas, there were purchased 278 specimens of plants that he had collected in the pinelands of northern British Honduras. His field work, unfortunately interrupted by illness, has yielded highly interesting results, especially because it has given further proof of the close relationship existing between the British Honduran flora and that of Yucatan, the two countries constituting an area sharply differentiated both geologically and floristically from the rest of Mexico and Central America. Mr. Lundell also presented 156 miscellaneous specimens from British Honduras and Texas.

The Dirección General de Agricultura of Guatemala forwarded as a gift 133 specimens of Guatemalan plants, chiefly from the higher mountains, and their names were supplied to the donor. Dr. Salvador Calderón of San Salvador, Salvador, presented, in continuation of his numerous earlier sendings, forty-two specimens of the plants of Salvador. Several of them represented new species or known ones that had not been reported previously from Salvador.

From the Second Marshall Field Archaeological Expedition to British Honduras there were received thirty herbarium specimens of

plants of that country. These were collected by Mr. J. Eric Thompson, in connection with his studies of the present-day Maya Indians.

From the Botanical Gardens and Arboretum of the University of Michigan there were received in exchange, through Professor H. H. Bartlett, 116 plants brought from Honduras by Professor A. M. Chickering. The collection was from the Tela region of the northern coast, and was of definite interest because that area was visited three years ago by Associate Curator Standley, who has prepared a report upon its flora. Several of the species collected by Professor Chickering were additions to the *Flora of the Lancetilla Valley*, recently completed by Mr. Standley and to be issued by the Museum in January of the coming year.

The School of Forestry of Yale University, through Professor Samuel J. Record, Research Associate in Wood Technology at Field Museum, continued its gifts of tropical collections. The material submitted included a number of interesting Central American plants, notably a Costa Rican tree (*Naucleopsis naga*) that proves to be another of the American "cow trees," that is, trees whose milky latex may be drunk like cow's milk. The gifts of the year from the School of Forestry included 352 specimens obtained in Liberia for Yale University by Mr. G. Proctor Cooper, who investigated the lumber resources of Liberia. Professor Record presented, further, eighty-seven specimens of trees from the Santa Marta region of Colombia, associable with wood specimens that he collected there at the beginning of 1930.

Of Mexican plants there were received ninety-one specimens, collected and presented by Mr. C. D. Mell, New York. They consisted chiefly of trees, with representatives of several rare and unusual species. Dr. C. A. Purpus of Zacuapam, Veracruz, presented thirteen specimens from the state in which he resides. They included several begonias belonging to species not illustrated previously in the Museum Herbarium.

The most valuable accession of West Indian plants consisted of 618 specimens collected in Cuba by Dr. Erik L. Ekman, and forwarded in exchange by the Riksmuseets Botaniska Afdelning, Stockholm, through the courtesy of Dr. Gunnar Samuelsson. Dr. Ekman has been engaged for many years in exploring Cuba and Hispaniola, and his investigations have added an immense number of plants to the recorded floras of those islands. The present sending contained many of the new species based upon the Ekman collections by Dr. Ignatius Urban, distinguished monographer of the West

Indian flora. It was a particularly welcome addition to the Museum Herbarium because it supplied material of so many of Dr. Urban's new species of the family Rubiaceae.

From Mr. E. J. Valeur, Monción, Dominican Republic, there were purchased 288 specimens of plants. His collection is a useful one because heretofore the Dominican flora has been as incompletely represented in Field Museum as in most other herbaria of the world.

Collections of Old World plants received during the year were not extensive. Besides the Liberian plants already mentioned, the accessions included 283 specimens collected for the Museum by Dr. A. W. Herre, a member of the Cornelius Crane Pacific Expedition of Field Museum. They were determined by Dr. E. D. Merrill, Director-in-Chief of the New York Botanical Garden, the leading authority upon the vegetation of the islands visited by the expedition.

From Mr. Walter J. Eyerdam, Seattle, Washington, there were purchased 263 plants that he had collected in Kamchatka. The Kamchatka flora is closely related to that of Alaska, and on that account the collection is an immediately useful one for purposes of comparison in study of the North American flora.

Dr. P. Aellen of Basel, Switzerland, forwarded in exchange 102 specimens of the genus *Chenopodium*. Dr. Aellen is the foremost authority upon this group, the pigweeds, and this authentically named series is a valuable addition to the Herbarium. Dr. Earl E. Sherff, of Chicago, in continuation of his donations of other years, presented twenty-eight specimens of plants of the family Compositae, mostly from Hawaii.

The North American section of the Herbarium was improved during 1930 by a large number of desirable additions, acquired by gift or in exchange. Mr. Hermann C. Benke continued his liberal donations of recent years by presenting 992 specimens that he had collected in the southwestern United States and in the upper Mississippi valley. Since he is a careful and critical student of the flora of the Chicago region, especially of the beautiful but difficult asters, his contributions make an important addition to the Illinois collections, as well as to the general Herbarium.

Several correspondents and visitors presented specimens of local plants, usually rare species, that help to enrich the representation of the flora of southern Lake Michigan, an area from which botanists naturally expect to find the most comprehensive collections in Field Museum. Mr. Dana K. Bailey, of New York, while on vacation near Chicago, collected and brought to the Museum plants of four

interesting gentians, one of which appears to represent a new color form. Mrs. Frances K. Hutchinson presented specimens of a remarkable albino mint (*Monarda*) that attracted the attention of Associate Curator Standley upon a visit to Wychwood, the famous wild flower preserve developed and maintained by Mrs. Hutchinson at Lake Geneva, Wisconsin.

Miss Nellie V. Haynie contributed nuts of the curious "peanut walnut," a freak Indiana tree that recently has attracted the attention of horticulturists. The nuts are remarkable for the fact that, when opened, the kernel may be removed easily, without breaking.

Mr. William F. C. Grams of Des Plaines, Illinois, presented thirty-four herbarium specimens of a curious cut-leaved burdock growing at Des Plaines. This plant is a remarkable one, named a few years ago by Mr. W. L. Clute, formerly of Joliet, Illinois, as a new form, *Arctium minus* f. *laciniatum*. It differs from the common burdock in having its leaves deeply cut and fringed. The burdock is a native of Europe, introduced and naturalized as a weed in the United States. Since search of botanical books failed to reveal mention of the occurrence of a cut-leaved plant in Europe, some of these recent specimens were sent to the Berlin Botanical Garden, and a letter was received from the director stating that the form could not be matched in that herbarium. It seems rather probable, consequently, that this abnormal form of the burdock, which has been found only in northern Illinois and adjacent Indiana, may have originated in the Chicago region as a sport or mutation from a normal plant.

Associate Curator Standley devoted the week-ends during the summer of 1930 to study of the flora of the Lake Michigan sand dunes region. He presented to the Museum 124 plant specimens from Illinois and Indiana, most of them representing rare species or additions to the local flora.

Mr. Karl P. Schmidt donated an interesting series of sixteen specimens of *Trillium*, collected to illustrate abnormalities of leaves and flower parts in that notoriously variable group. Professor L. A. Kenoyer presented 190 specimens from Kalamazoo County, Michigan. A gift from Dr. C. J. Chamberlain of the University of Chicago consisted of seeds of four rare cycads.

From Mr. E. R. Bogusch, of Pullman, Washington, there was received as a gift a collection of seventy-eight plants from the western United States. Mr. V. L. Cory, Sonora, Texas, presented three specimens of species that he had described recently as new.

Mrs. Leonora S. Curtin, Santa Fe, New Mexico, contributed 144 specimens of New Mexican plants, collected in the course of her studies of the ethnobotany of the southwest. Professor A. O. Garrett of Salt Lake City forwarded 177 specimens of Utah plants, many of which represented species that are meagerly represented in herbaria. From Professor Albert Ruth, Fort Worth, Texas, there were received, as a gift, forty-one plant specimens and packets of seeds, collected in northern Texas.

Several important lots of North American plants were accessioned as exchanges in return for similar sendings dispatched by Field Museum. From Arnold Arboretum, Jamaica Plain, Massachusetts, there were received 298 specimens, chiefly from the collections made in the southern states by Mr. E. J. Palmer. The California Academy of Sciences, San Francisco, through Miss Alice Eastwood, forwarded 654 specimens, chiefly Californian. The Department of Botany of the University of California transmitted in exchange 629 specimens of flowering plants and ferns, some of them from the herbarium of the late Mr. J. G. Lemmon, a pioneer botanist of California. From the same institution there was received, through the courtesy of Professor W. A. Setchell, a set of 483 specimens of seaweeds.

The Catholic University of America, Washington, D.C., sent in exchange 238 specimens of plants, the majority of which were collected in Florida by Rev. Hugh O'Neill. Mr. Ludlow Griscom, Cambridge, Massachusetts, forwarded on an exchange basis a set of 192 plants that he had collected in Newfoundland.

From the Milwaukee Public Museum, through Mr. Huron H. Smith, there was received in exchange a series of 536 Wisconsin plants, a valuable representation of the flora of the upper Mississippi valley. The Department of Botany of the University of Wisconsin, through Professor N. C. Fassett, forwarded 327 specimens illustrating the more critical species of the flora of the same state. From Cornell University, Ithaca, New York, there were received in exchange, through Professor K. M. Wiegand, 445 specimens collected in New York.

Among the accessions there should be mentioned, also, 5,166 negatives of photographs of type specimens of South American plants in the Berlin herbarium. These were obtained through the Rockefeller Foundation Fund for Photographing Type Specimens, and are discussed at greater length elsewhere in this Report.

Through Professor Samuel J. Record, Research Associate in Wood Technology, several important gifts of wood material for exhibition

purposes have been received during the past year. Particularly noteworthy are thirty-two veneered panels representing important commercial woods from various parts of the world such as Africa, Australia, Brazil, Europe, India, Burma, Ceylon, Celebes and Japan. This valuable contribution, generously donated by Penrod, Jurden and Clark of Cincinnati, Ohio, will make an attractive exhibit when it is installed in the Hall of Foreign Woods, which is to be rearranged.

Useful material for the completion of the eastern white pine exhibit in the Hall of North American Woods was furnished by Mr. Charles Grosskurth of A. P. Bigelow and Company, of Long Island City, New York.

Two boards of pitch pine, required to complete an exhibit of this important American wood, were acquired by gift from the Pennsylvania Department of Forests and Waters, Harrisburg.

E. L. Bruce Company of Memphis, Tennessee, supplied two boards of red gum which will replace defective boards now on exhibition.

A small sample of alder wood was received from Mr. O. J. Salo of Red Lodge, Montana. Rev. I. Chateau of Mission, Texas, donated a hand specimen of Ephedra wood.

Mr. W. E. Bletsch of Highland Park, Illinois, an Associate Member of the Museum, again demonstrated his interest in the study of woods by contributing thirty-four samples of North American species. In addition, at his own expense, he had a large number of Brazilian, Jamaican and Formosan woods cut into hand specimens which will be used for exchange purposes.

The School of Forestry at Yale University donated eight samples of woods from the Belgian Congo, obtained through M. Parlongue from the Comptoir de Vente de Bois Coloniaux, Brussels.

To augment the study series the Museum purchased 162 small samples of Porto Rican woods from Dr. Justo D. Barea of San German, Porto Rico.

Two specimens of African mahogany (*Khaya ivoriensis*) from the Ivory Coast were received from the Forest Service of West Africa. This wood has a rich, dark color and is somewhat heavier than that of other African mahoganies. It represents the species from which most of the coastal mahogany is obtained.

Dr. Salvador Calderón of the laboratories of the Department of Agriculture, San Salvador, Salvador, presented the Museum with two hand specimens of local woods.

The most notable addition to the Museum's series of tropical woods was the collection, numbering 1,066 specimens, brought back by the Peruvian division of the Marshall Field Botanical Expedition to the Amazon. Inclusive of the material received by the Museum during the previous year, the total number of wood specimens assembled by the expedition in eastern Peru amounts to 2,154.

The Hercules Powder Company, Wilmington, Delaware, kindly contributed to the exhibit of steam distillation products obtained from soft wood, sending abundant material of thirty-two different products from this rapidly expanding industry. These include pieces of raw material, roots of the long-leaf pine in various stages of preparation, material representing the various important steps in the manufacturing process, samples of the finished product, and many hydrocarbons, alcohols, essential oils, and resins used in commerce.

For the corn products exhibit the Chemical Engineering Department of Iowa State College has given valuable and interesting material demonstrating the present state of progress in this industry. Fourteen specimens, representative of various stages in the manufacture, and finished products are included. Among the stalk products are pressed board, pith board, and paper pulp. Corncob products are represented by charcoal, flour, adhesive, and tar.

For the exhibit of starch plants of economic importance the Bishop Museum, Honolulu, Hawaii, kindly supplied a lot of tubers of *Tacca*. Sago palm material for the same purpose was received from the Botanic Garden of Buitenzorg, Java. This material, consisting of eight specimens, shows different stages in the preparation of sago starch and includes a piece from a trunk of the palm.

The timely arrival of excellent specimens of flax plants, straw, retted straw, fiber, tow, and seed donated by the State Flax Industry, Salem, Oregon, made it possible to improve considerably the exhibits of this important fiber plant in Hall 28.

For the cotton exhibit Mr. John R. Millar of the Department of Botany presented two short staple cotton plants obtained by him near Americus, Sumpter County, Georgia, and also some photographs illustrating phases of the cotton industry.

For other fiber exhibits three sacks made of various plant fibers from different parts of the world were kindly furnished by McLaughlin Brothers and Company of Chicago.

From the Peruvian division of the Marshall Field Botanical Expedition to the Amazon the Department received numerous

samples of cotton of different grades cultivated in the lower region of the river Ucayali. From the vicinity of Tarapoto, in the Department of San Martin, renowned for its fine quality of coffee, specimens of that commodity and of cane sugar were obtained. From Morales, a village adjacent to Tarapoto, the expedition brought samples of the fine grade of tobacco for which this village is famous in eastern Peru.

This expedition also secured specimens of various herbs, shrubs, and resins used by the Indians for medicinal purposes as well as samples of rubber, balata, chicle, caucho, and the principal palm fibers employed by the natives. These are interesting for comparison with the material secured last year from the lower Amazon.

Samples of the arrow poison used by the Peruvian Indians, and also of the fish poison prepared from the roots of the vine known in Peru as "barbasco" (*Lonchocarpus nicou* (Aubl.) DC.), were likewise obtained by the expedition.

An item of unusual interest added to the collections, also from the Peruvian expedition, is a sample of a narcotic drink used in copious quantities by the Peruvian Indians at their feasts. This is an infusion prepared from a malpighiaceae liana known in the vernacular as "ayahuasca," meaning the death vine, and probably identical with the "caapi" mentioned by Spruce. Sufficient material of this is on hand to permit its distribution to various institutions that may be interested in the investigation of the action of this narcotic.

Mr. Paul Van Cleef of Chicago donated a small porcelain cup which had been used by the natives of the Malay Peninsula to gather the latex from the cultivated rubber trees.

The Department of Geology transferred to Botany a lot of seeds of *Bixa*, which furnish the orange dye annatto. These were obtained by Curator O. C. Farrington of the Department of Geology in the state of Bahia during the Marshall Field Brazilian Expedition of 1923. There were also transferred from the Department of Anthropology for use in the economic exhibits seventeen strings of seeds or other plant materials from various sources—South America, Africa, and China.

GEOLOGY.—An accession of much importance and value is the 745-pound Paragould (Arkansas) stone meteorite, a gift from President Stanley Field. The fall of this meteorite was observed on February 17, 1930. The large stone obtained for the Museum is the

greatest single mass ever seen to reach the earth from outer space. This gives this meteoric stone a unique value, and its acquisition considerably increases the value of the meteorite collection as a whole.

Mr. William J. Chalmers, of Chicago, continued his generous contributions to the crystal collection, and through his liberality specimens of many of the latest and best finds have been added to it. Of these, a giant crystal of beryl from Maine, three feet long and two feet in diameter and weighing nearly 1,000 pounds, is of first importance. This specimen is remarkable not only for its size but for the well-defined prismatic planes by which it is bounded. It is a unique illustration of the size which crystals may attain.

Other specimens from Mr. Chalmers include: a large mass of feldspar from Maine penetrated by beautiful green and pink tourmalines; fine specimens of the rare iron-aluminum phosphates, vauxite and metavauxite from Bolivia; a very fine specimen of the rare zinc phosphate, hopeite; a beautifully crystallized specimen of the rare calcium borate, meyerhofferite, from Death Valley, California; an especially fine lazurite from Afghanistan; a large group of azurite crystals from southwest Africa; an addition to the series of tourmalines in the shape of a section showing the remarkable internal structure of a large Madagascar tourmaline; an unusual form of cerussite shown by four specimens of twin crystals; six specimens of crystallized gold from Placer County, California; a number of specimens obtained by Mr. Chalmers in Arizona, which included fine pieces of turquoise, chrysocolla and malachite, and an addition to the mercury ores in the shape of cinnabar from the mines of the Quicksilver Corporation, near Phoenix, Arizona.

A large mass of andalusite crystals showing also some rutile and lazurite was presented by the Champion Porcelain Company, of Detroit, Michigan. This specimen not only shows andalusite in an unusual crystal form, but also illustrates an important economic product.

Mr. R. T. Crane, Jr., of Chicago, donated a cut, brown-pink gem tourmaline weighing fifty-eight carats, which has been added to the gem collection in H. N. Higinbotham Hall. This adds a large and flawless gem of a color not previously represented.

Two fine specimens of thiolite from Lovelock, Nevada, weighing about fifty pounds each, presented by Mr. John T. Reid, of Lovelock, afford the first representation of this peculiar formation which the Museum has ever received. These specimens are especially valuable also in showing phases of the occurrence which are rarely seen.

Mr. William B. Pitts of Sunnyvale, California, presented ten polished specimens of oolitic jasper from California and a specimen of petrified cactus from Arizona. The specimens of oolitic jasper show a range of colors and patterns which is unusual and pleasing, and the specimen of petrified cactus is the first petrification of this plant which has thus far been received.

Miss Elizabeth Telling, of Chicago, presented a series of specimens of native copper, iron ores, barite, prehnite and other minerals from regions about the shores of Lake Superior. These had been collected by her father, the late John Telling, in many years of travels in the region.

Five specimens of colored sands from occurrences at McGregor, Iowa, presented by Mr. C. A. Kent of Evanston, Illinois, illustrate colors used in the making of "sand paintings." These were supplemented by a gift from Miss Pauline Williams, Chicago, of a remarkable sand picture made in 1860 by the artist, Andrew Clemens, who attained a wide reputation in this work. Miss Williams accompanied the picture with a specimen of the sandstone from which the different colored sands were obtained.

Mr. Frank von Drasek, of Cicero, Illinois, continued his generosity in supplying the Museum with minerals from Arkansas by contributing a fine group of quartz crystals, a number of specimens of brookite, elaeolite and schorlomite, and twenty-two cabochon cut amethysts, quartzes, agates and schorlomites.

Several individuals have presented concretions which increase the representation of varieties of these peculiar formations and of the localities from which they are obtained. An especially interesting group of these was presented by Mr. J. W. Johnston of Chicago and Mr. H. S. Roach, Silver City, New Mexico. This comprised twenty-four specimens of siliceous concretions from New Mexico, which strikingly resemble fossil eggs.

A core of granite, ten feet long and two inches in diameter, made with a diamond drill and presented by the Sullivan Machinery Company, Denver, Colorado, through Mr. John Emrick, affords a remarkable example of this kind of work.

Six specimens of petroleum and four of petroleum-bearing sands from Kentucky, presented by Mr. K. Z. Wilking, Owensboro, Kentucky, make a welcome addition to the series representing the petroleum of that state.

Thirty-four negatives of views of Yellowstone Park presented by Associate Curator Elmer S. Riggs afford excellent representations of the geysers and other phenomena to be seen there.

Thirty-six specimens of fossil plants from Galesburg, Illinois, presented by Rev. Walter H. Smith, of Galesburg, are an appreciated addition to the representation of the fossil flora occurring at that locality.

A number of specimens of fossil worms from an occurrence near Blue Island, Illinois, were collected and presented by Messrs. Bryan Patterson, Jack Appel, Scott Griffith and Edward Espenshade, all of Chicago. Such fossils are an unusual occurrence, preservation of such soft-bodied creatures as worms being rarely known, especially from a period so remote in time.

Thirty-six specimens of fossil pelecypods and cephalopods of Cretaceous age occurring near the headwaters of the Amazon were given by Señor M. L. Velasco of Iquitos, Peru.

Fewer specimens than usual were obtained by exchange, but some of these were of much value. They included two specimens of the rare Winona meteorite from Mr. L. F. Brady, Flagstaff, Arizona, and an etched section of the Huizopa meteorite from Mr. H. H. Nininger, Palmer Lake, Colorado. From Rev. Walter H. Smith of Galesburg, Illinois, forty-four specimens of fossil plants of the Carboniferous period and associated mollusks from coal mines at Galesburg were received by exchange. This accession also included a large slab of amphibian tracks from Grand Canyon, Arizona. From the American Museum of Natural History, New York, two specimens representing fossil cones of *Araucarites* were received by exchange.

Obtained partly by purchase and partly by exchange, a fossilized skeleton of the extinct fish-lizard *Ichthyosaurus* was an important acquisition. Not only was this skeleton preserved complete to the minutest bones, but the slab of stone in which it was imbedded shows also a clear impression of the outline of the body of the animal, including the fins and tail. This individual evidently was a comparatively young one, having a length of about four feet.

Forty-five specimens of fossil fish, plants and rocks from localities in eastern Canada not previously represented were obtained by purchase. The fossil fish were chiefly ostracoderms from Scaumenac Bay, Quebec. The plants were of Carboniferous age, and came from Joggins, Nova Scotia, and Fern Ledges, New Brunswick. The rocks represented rare varieties occurring in the vicinity of Montreal.

A skull of *Protitanotherium* from Utah, and fifty-eight specimens of trilobites, also from Utah, were other fossils purchased. The *Protitanotherium* is of interest as being an animal ancestral to the later and better known titanotheres.

Another important specimen obtained by purchase was a mass of lodestone weighing about 400 pounds. The magnetism in this mass is so strong as to overcome the effect of gravity on small iron objects placed within its field without making contact with them.

Two new falls were added to the meteorite collection by the purchase of specimens from two new localities in Mexico.

A series of pebbles showing carving by natural sand blasts, and representing localities in New Zealand and Africa, was obtained by purchase, as were also a large specimen of orbicular diabase from Canada and two specimens of the peculiar rock from Australia known as "zebra" rock.

The Florissant (Colorado) Expedition collected 396 specimens of fossil plants, 141 specimens of fossil insects and spiders, twenty-four specimens of mollusks and ostracods, one specimen of a fossil bird feather and eight specimens of rocks and minerals. The Braidwood (Illinois) Expedition obtained 126 specimens of fossil plants. Thirty-five specimens of fossil plants were collected by an expedition to Terre Haute, Indiana. Two expeditions to the Sag Canal, Illinois, collected twenty-two specimens of fossil worms and three of graptolites. As the locality at which these fossils occur is limited and liable to exhaustion, the Museum is fortunate to have secured so large a representation of them.

Sixteen specimens of fossil invertebrates from Tarapoto, Peru, collected by Mr. Llewelyn Williams of the Marshall Field Botanical Expedition to the Amazon, enabled useful comparisons as to locality and species to be made with similar fossils which had been presented by Señor Velasco of Iquitos.

From the collections of the Marshall Field North Arabian Desert Expedition of 1928 there were received 151 specimens of residual flints and associated rocks and six specimens of sands. These were collected at various points in the desert. Besides contributing to a knowledge of the geology of the region, these specimens illustrate varieties of coloration, form and etching, due to desert conditions.

ZOOLOGY.—The total number of zoological specimens accessioned is 13,142, which is slightly less than the average for the past five years, which was 14,513. The reduced number in 1930 is probably



PUEBLO POTTERY OF EARLY MESA VERDE TYPE

Decorated with geometric designs painted in black and white. The mug has a double bottom filled with clay pellets which rattle when mug is used

Field Museum Archaeological Expedition to the Southwest

About one-half actual size

due to the fact that quantities of material collected by the larger expeditions were still in transit at the end of the year. The accessions are distributed as follows: mammals, 672; birds, 9,619; reptiles and amphibians, 1,004; fishes, 525; insects, 1,002; lower invertebrates, 271; skeletons, 49. The number obtained by Museum expeditions is 3,389; by gift, 1,714; by purchase, 7,757; and by exchange, 282.

A number of valuable large mammals were received as gifts. Messrs. Honore Palmer and John Wentworth, of Chicago, presented a collection of fifty-five African game animals, mostly represented by scalps and skulls collected in Kenya and Tanganyika.

Mr. Fred Lewis of Diamond Bar Ranch, California, presented the skin of a large black rhinoceros, also from Tanganyika.

His Highness Dilipat Singh of Singahi, Kheri District, Oudh, India, presented the skin, skull and skeleton of an Indian sloth bear shot by himself. Such a complete specimen of this animal is a very desirable acquisition.

Two skins of the gaur ox or seladang taken in Indo-China were sent as a gift by Mr. Charles Rydell of San Francisco. These provide additional material from which to select specimens to be used in a habitat group of these animals for William V. Kelley Hall.

By exchange with the Museum of Comparative Zoology, at Harvard University, Cambridge, Massachusetts, 213 specimens of mammals from all parts of the world were obtained. A skin of a fine male of Steller's sea-lion was acquired by exchange with the University of Iowa.

Mammals received from expeditions were relatively few, numbering only 173 specimens. Most important was a second skin, skull and leg bones of the giant panda from western China. This came as a sequel to the William V. Kelley-Roosevelts Expedition to Eastern Asia for Field Museum, through Dr. R. L. Crook, a missionary in Yachow, China, who was commissioned to get it by Messrs. Theodore and Kermit Roosevelt. The skin is complete and in excellent condition. In similar manner there were received, through instructions left by the Kelley-Roosevelts Expedition, one bull banting, one cow seladang, a barking deer and a leopard. These were collected by Mr. F. J. Defosse in southern Indo-China.

From the Third Asiatic Expedition of the American Museum of Natural History, in which Field Museum continued to cooperate, a further consignment of mammals was received, consisting of 153 carnivores and bats.

Accessions of birds were unusually large, due mainly to several advantageous purchases. Most important was the acquisition of the private collection of the late Edward E. Armstrong of Chicago. This collection consists of 5,981 bird skins from North America, Costa Rica, and Colombia, all very carefully prepared and of high quality. It not only adds a large number of species previously unrepresented in the Museum, but also supplements in a most useful way the Museum's series of North American birds. Among many rarities, *Arinia boucardi*, *Leucuria phalerata*, *Carpodectes outoniae*, and *Habia atro-maxillaris* may be mentioned as of particular interest.

A second important purchase was that of a collection of Australian birds obtained from Mr. James W. Woodhead of Auckland, New Zealand. The avifauna of the peculiar Australian region was previously represented in the Museum's collection only by a few odd specimens of poor quality. Also through purchase, 314 birds from southern Parana and Santa Catherina, Brazil, came into possession of the Museum. The region was previously unrepresented in the Museum, and this relatively small collection is therefore an important acquisition. Especially noteworthy are *Leptotriccus sylvicola*, *Otus sanctae-catherinae*, and *Amazona vinacea*.

From the William V. Kelley-Roosevelts Expedition there were received 1,149 birds collected in Yunnan and Szechwan, China, by Mr. Herbert Stevens, while a member of this expedition. Through the same source, as Field Museum's share of M. Jean Delacour's expedition to Indo-China in 1930, there were acquired 1,053 birds of that region. This lot supplements collections made in 1929 and is rich in characteristic species of the peculiar Indo-Chinese fauna. Several examples of the rare trogon, *Pyrotrogon wardi*, are worthy of special mention.

By exchange with the Museum of Comparative Zoology, at Harvard University, there was obtained a specimen of the rare bird, *Boanerges internigrans*, from China, which is allied to the Canadian jay. Two rare petrels from the South Pacific Ocean were received in exchange from the American Museum of Natural History, New York.

Notable among gifts of reptiles are three rare South African lizards from Dr. W. J. Cameron of Chicago; an exceptionally fine "glass snake" from the Indiana dunes, presented by Mr. Maurice Weil of Chicago; a rare West African gecko from Miss Emily A. Clark of the Interdenominational Mission in Nigeria; thirty-four specimens from Mr. D. S. Bullock of Angol, Chile; and eleven specimens from Irak,

supplementing the Museum's North Arabian collections, from Mr. E. S. Fraser of Rutba Post, Irak. Dr. Alfred S. Romer, of the University of Chicago, presented forty-three specimens collected in South Africa during the university's recent paleontological expedition to that region.

Through arrangements made by members of the William V. Kelley-Roosevelts Expedition, 162 specimens of Indo-Chinese reptiles and batrachians were received from Dr. Bourret of Hanoi, Tonkin. These form a welcome and valuable addition to the collections directly made by the expedition in 1929. Other material from expeditions which is especially notable is that from the Chancellor-Stuart-Field Museum Expedition to the South Pacific, which includes specimens of the dragon lizard of Komodo, furnishing the basis for important new exhibits, and specimens of the New Zealand tuatara or *Sphenodon*, these being the first alcoholic specimens of this rare and remarkable reptile to reach Field Museum. Further important accessions of reptiles and amphibians were received from expeditions conducted by other Departments of the Museum, namely, the Frederick H. Rawson-Field Museum Expedition to West Africa, under the leadership of Mr. W. D. Hambly, and the Peruvian division of the Marshall Field Botanical Expedition to the Amazon, conducted by Mr. Llewelyn Williams.

Among gifts of fishes there may be especially mentioned five specimens of the fresh-water sculpin from Onondaga Cave, Leasburg, Missouri, received from Mr. Russell T. Neville of Kewanee, Illinois. These seem to represent a new type of cave-inhabiting fish which may prove to be of much interest. Other gifts include a large specimen of the American sole (*Achirus fasciatus*) from the United States Bureau of Fisheries; a small brown trout from Mr. A. J. Franzen of Chicago; and a large example of the silvery lamprey from Mr. Otis Dunkleberger of Mishawaka, Indiana. Two small eels (*Akhia egmontis*) presented by the General Biological Supply House of Chicago, represent a species that has been very rare in collections and one which merits special study.

Through cooperation with the John G. Shedd Aquarium, a number of selected specimens of fishes have been acquired from among those that have died in transit to the aquarium or shortly after arrival there. These, being in fresh condition, have furnished especially suitable material for preparation by the "celluloid" process. Among those so obtained were a batfish (*Ogcocephalus radiatus*), a sea robin

(*Prionotus strigatus*), and a scorpion fish (*Scorpaena plumieri*). Also obtained for reproduction were specimens of the long-horned Atlantic sculpin, purchased from the Marine Biological Laboratory, Woods Hole, Massachusetts.

Fishes from expeditions were confined to those obtained in Java, Sumatra and Singapore by the Chancellor-Stuart-Field Museum Expedition to the South Pacific. They are 437 in number and nearly all the species are new to the Museum's collection.

Gifts of insects numbered 993, mostly of species found in North America, only seventy-eight specimens being from foreign countries. The largest and most noteworthy gift was that of 188 authentically named, cynipid gall insects, including thirty-three paratypes of twenty-eight species; and 407 insect galls, embracing eighty-three paratypes of fifty-eight species, presented by Dr. A. C. Kinsey, University of Indiana, Bloomington, Indiana. These minute insects, which belong to the order containing the bees and wasps, are responsible for most of the small, abnormal growths found on the leaves and twigs of trees, especially oaks. Since the adult insects are rarely collected directly but are bred from the galls they produce, a series like that donated by Dr. Kinsey is not easy to obtain.

Another specialist on these insects, Dr. Lewis H. Weld of East Falls Church, Virginia, also presented paratypes of newly described gall insects consisting of fifteen of the insects and sixteen of their galls from Arizona.

Mr. Bryan Patterson of Chicago presented 160 insects of various orders from Colorado. Another welcome gift was that of seventy-nine beetles from California and Washington, received from Mr. Emil Liljeblad of Chicago.

Insects from foreign countries included twenty-three butterflies from Sierra Leone, obtained by Mr. W. D. Hambly, leader of the Frederick H. Rawson-Field Museum Ethnological Expedition to West Africa. Two gall insects and twenty-one insect galls from France were presented by Dr. R. Salgues of Brignoles, Var, France.

Accessions of invertebrates other than insects were 271 in number. Most important were 224 fresh-water shells from the southern United States, presented by Professor J. K. Strecker of Waco, Texas; and twenty-six crustaceans obtained by the Chancellor-Stuart-Field Museum Expedition to the South Pacific.



A FLOWERING SPADIX OF THE BACABA PALM ON THE FORD CONCESSION,
TAPAJÓZ RIVER, BRAZIL

The collector is Mr. José M. Damasceno, who is continuing,
under the auspices of the Companhia Ford do Brasil, the botanical collecting
begun by the Marshall Field Amazon Expedition of 1929

DEPARTMENTAL CATALOGUING, INVENTORYING AND LABELING

ANTHROPOLOGY.—Fifty-three of the fifty-eight accessions received in the Department of Anthropology during the year have been entered. Nineteen accessions from previous years were also entered.

The work of cataloguing has been continued as usual during the current year, the number of catalogue cards prepared totaling 3,647. The total number of catalogue cards entered from the opening of the first volume is 192,702.

The 3,647 cards written during 1930 for accessions received in the course of the year are distributed according to subjects as follows: North American archaeology and ethnology, 1,927; Mexican, Central and South American archaeology and ethnology, 537; archaeology of China, 30; ethnology of India, 2; ethnology of Malaysia, 6; ethnology of Polynesia, 1; ethnology of Australia, 40; ethnology of Africa, 1,071; archaeology of Egypt, 16; archaeology of Mesopotamia, 8; prehistoric archaeology of Europe, 9.

All these cards, with the addition of 433 cards prepared last year, making a total of 4,080 cards, have been entered in the inventory books, which now number fifty-three volumes.

A total of 10,367 copies of labels for use in exhibition cases were supplied during the year by the Division of Printing. These labels are distributed over the exhibition halls as follows: ethnology of Micronesia and Polynesia, 2,547; archaeology of Egypt, 988; model of Taj Mahal, India, 3; classical archaeology, 107; ethnology of Woodland and Plains Indians, 3,856; Southwest ethnology, 613; ethnology and archaeology of Mexico, 1,296; ethnology of South America, 688; group cases, totem poles and house posts in Hall 10, 229; archaeology of China, 40. Also supplied to the Department by the Division of Printing were 150 sketch maps for exhibition cases and 5,650 catalogue cards. All new labels for Hall F (Ethnology of Micronesia and Polynesia) are now ready to be installed at the earliest opportunity next year.

The total number of photographs mounted in albums amounts to 1,321. Five new albums were opened, two for India, two for Africa, and one for photographs used in publications.

BOTANY.—In preparation for the retirement of the black labels in the Hall of Plant Life new copy was prepared and printed for many of the case labels there.

Descriptive labels were written by Assistant Curator James B. McNair during the year for the exhibit of spices and condiments in Hall 25. Labels were also written for the various exhibits in Hall 28 of distillation products from wood and of resins, lacquers, turpentine, and fibers.

After the return of Mr. Llewelyn Williams, Assistant in Wood Technology, from Peru, Assistant Curator McNair and Mr. Williams resumed in June the poisoning, bottling, labeling, and card cataloguing of economic botanical specimens as described in the Annual Report for 1928 (p. 473), which was interrupted by Mr. Williams' expedition to Peru. This year they have thus treated wood distillation products, tan barks, cork, and rubber.

The filing, as a card index, of copies of the labels in the exhibition halls has been continued and the files of labels for the economic specimens on display is complete to date.

During 1930 there were added to the Herbarium 21,915 sheets of plants. The total number of mounted specimens now in the Herbarium is 622,251.

Herbarium labels were written for many thousands of specimens received during the year, the largest collection thus treated being that brought from Peru by Mr. Williams. Thousands of labels were prepared, also, for the duplicate specimens distributed in exchange.

A card index of the collectors represented by specimens in the Herbarium is maintained by the Custodian of the Herbarium, Mr. Carl Neuberth. He also maintains an index showing the number of herbarium specimens from each country or other political division. The collector index now contains 11,409 cards, representing almost as many different collectors, 402 cards having been added to it during the past year. The geographic index consists of 3,122 cards. By consulting it, it is possible to learn in a moment to what extent the flora of any country or state is represented in the collections of Field Museum.

More than 1,500 index cards were received this year from the Institut Colonial de Marseille, Marseilles, France, and the cards of this catalogue now number 6,175. They have been sorted and filed by Assistant Curator McNair. As mentioned elsewhere in the Report, he has in process of formation card catalogues of plants that yield alkaloids, arrow and fish poisons, oils, drying and non-drying, and waxes. This card catalogue has proved very useful in dealing with the economic material of the Department as well as for reference in the preparation of technical papers.

The Department catalogue of the books and pamphlets in the botanical library, on which the Librarian, Miss Edith M. Vincent, who also has charge of the Department files of accessions, exchanges, and loans, has been engaged in her spare time for several years, has been completed for the sections of dendrology and forestry, economic botany, horticulture, plant pathology, monographs, medical botany, and floras of the West Indies, Mexico, Central and South America. The Gray Herbarium card catalogue of new American species, to which the Museum is a subscriber, is kept in order by Miss Vincent, and the new issues of cards are inserted as soon as they are received. Each issue consists of from 1,200 to 1,500 cards and the issues are received quarterly.

GEOLOGY.—The work of cataloguing kept pace with the receipt of accessions except in regard to the vertebrate fossils. Most of these are catalogued only as they are freed from matrix and identified. The total number of specimens catalogued during the year was 1,766, making the total number of entries in the Department 187,358. The greater number of specimens catalogued during the year was received from expeditions, 570 specimens being recorded from the Florissant Expedition, 157 from the Marshall Field North Arabian Desert Expedition, and 126 from the Braidwood (Illinois) Expedition. Entries of specimens received by gift included 64 from Mr. Frank von Drasek, 56 from the estate of John Telling and 44 from Mr. Walter H. Smith. To the card catalogue of vertebrate fossils 174 cards were added during the year. These cards, as previously noted, describe each specimen, give field number, name of collector, date of collection, locality, horizon and reference to description of specimen.

A total of 6,667 labels was received from the Division of Printing, and of these 5,196 were installed. The number of labels written, printed and installed during the year includes 2,539 for the systematic mineral exhibit and 1,296 for the systematic rock exhibit. For the meteorite exhibit 1,240 labels were prepared and printed, thirteen of these being descriptive. Of these, the descriptive labels were installed. For the exhibits in Frederick J. V. Skiff Hall, 456 labels were written and printed, and nearly all were installed. The remaining labels written, printed and installed during the year related chiefly to the petroleum, pigment, physical geology and paleontological exhibits. Thirty labels were prepared and installed for the murals in Ernest R. Graham Hall and illuminated labels were prepared and installed for the *Mesohippus* group. Typewritten labels

to the number of 287 were prepared and installed with some special exhibits.

Photographic prints to the number of 777 were added to the Department albums, making a total of 7,136 now available. Of the prints added, 555 were views in South America from negatives made by the Marshall Field Paleontological Expeditions, and 100 were of plates of vertebrate fossils. Typewritten labels were prepared and affixed to all the prints mounted. One hundred and fifty-seven topographic maps of the United States Geological Survey were added to the map series and filed under their respective states. A descriptive label was prepared and filed with each map. The total number of these maps now filed and available for study is 3,332.

ZOOLOGY.—A total of 8,734 specimens was numbered and entered in the Department catalogues. They were distributed, by divisions, as follows: mammals, 1,383; birds, 4,646; reptiles and amphibians, 2,065; fishes, 591; skeletons, 49.

Museum labels with full data were provided for 574 skins of mammals and for about 2,000 skulls in bottles. The card index of the mammal collection received 907 additions. Labeling and indexing the skulls of large mammals were begun, and guide labels were placed on most of the new storage cases and the separate drawers in them. Labels were provided for all new exhibits of mammals.

Good progress was made in cataloguing and labeling bird skins and in incorporating new acquisitions in classified position in the collection. The total number of catalogue entries of birds for the year is 4,646.

In the Division of Reptiles and Amphibians, 2,065 catalogue entries were made. Inside labels were adopted for use in the glass containers, thus greatly facilitating the labeling and shelving of specimens as they are identified.

New entries in the catalogue of fishes were made to the number of 591. A card index of the genera and families of recent fishes was begun, to be used as a finding list and key to the arrangement of the reference collections. For this list 3,079 cards were written.

No cataloguing of invertebrates was done during the year. Most of the insects accessioned were pinned and labeled shortly after receipt. For the exhibit of lower invertebrates in Stanley Field Hall, seventy-five new labels were installed. The skeletons catalogued and indexed number forty-nine.

The photographic prints mounted in the departmental albums amount to 1,297, with the addition of three albums.

The state of the catalogues at the end of the year is as follows:

	Number of record books	Total of entries to Dec. 31, 1930	Entries during 1930	Total of cards written
Department of Anthropology.....	53	192,702	4,080	196,822
Department of Botany.....	63	622,251	21,915	16,283
Department of Geology.....	26	187,358	1,766	7,104
Department of Zoology.....	43	154,446	8,734	41,769
Library.....	16	189,643	3,334	393,802

INSTALLATIONS AND REARRANGEMENTS

ANTHROPOLOGY.—The main efforts during the current year were directed toward the completion of the Egyptian Hall, and the reinstallation of James Nelson and Anna Louise Raymond Hall and Halls 5 and 6 on the first floor. Numerous additions and improvements were made also in almost all other halls of the Department.

A total of eighty-five exhibition cases was installed during the year, distributed as follows:

	Cases
Egypt (Hall J).....	15
Polynesia (Hall F).....	1
Stanley Field Hall.....	1
Edward E. and Emma B. Ayer Hall.....	1
James Nelson and Anna Louise Raymond Hall.....	21
Plains Indians (Hall 5).....	20
California and Southwest Nomadic Tribes (Hall 6).....	14
Mexico and Central America (Hall 8).....	11
South America (Hall 9).....	1
Total.....	85

The hall devoted to the archaeology of ancient Egypt (Hall J) may now be reported as practically complete. All the thirty-seven individually lighted floor cases especially constructed for this hall are now installed, fifteen of these having been installed during the past year. There remain now three large wall cases whose installation may be expected in the early part of 1931. The material installed during the year comprises animal and bird mummies, amulets, jewelry, sandals, baskets, headrests, writing implements, tools and weapons, vessels of bronze and lead, Coptic metal work of post-Christian times, weights, and miscellaneous groups including faces from wooden coffins, infant mummies and mummy heads.

One of the most interesting exhibits added to the Egyptian Hall this year is a predynastic burial containing the desiccated body of a woman who died prior to 3500 B.C. This type of burial preceded the

development of mummification which resulted in the erection of elaborate tombs. The body, with head facing south and with limbs flexed, was simply laid to rest in a shallow pit dug in the desert sand, and such a pit of actual size is shown in the exhibit. The body rests on a grass mat held together by twisted cords of flax heavily coated with pitch. Over the body was thrown a garment of skins with the short fur on the inside, and this in turn was covered by a cloth woven of linen. Another grass mat was thrown over the body to protect it from the sand with which the pit was refilled after burial. Pottery jars containing food and drink were placed around the body.

Two newly installed six-foot cases with buff-colored backgrounds, and bases covered with cloth contain nineteen plaster reproductions of important Egyptian statuary, the originals of which are in other museums. Their value has been greatly enhanced by painting them in the colors of the original stones—limestone, granite, diorite, and basalt. One of these cases is illustrated in Plate XXVII of this Report as an example of this new method of installation.

As it was decided in November to devote Halls B and C on the north side of the ground floor to the future exhibits relating to the races of man and the prehistoric archaeology of western Europe respectively, it became necessary to transfer Frank W. Gunsaulus Hall from the west end of Hall C to the east section of Hall K.

The alabaster model of the Taj Mahal presented by Mr. Sidney Weiss this year is on exhibition in the center aisle of Hall E.

An unusually large piece of painted tapa cloth from Fiji, presented last year by Mr. Cornelius Crane, who conducted the Cornelius Crane Pacific Expedition, was recently placed on exhibition in Hall F, where it occupies an entire case. This tapa, decorated with a great variety of painted geometric patterns in colors, was used as a mosquito curtain, and measures fifteen by twenty feet.

A leaf shelter supported by bamboo poles has been provided for the Semang fire-maker group installed in the center of Hall G (Arthur B. Jones Collection). Such leaf shelters are the typical habitations of the Semang of the Malay Peninsula, and the fire-maker is now shown in his natural habitat, which simultaneously conveys some impression of the tropical jungle. A carabao cart and eight human figures have been added to the miniature model of a Menangkabau village in the same hall.

Case 7 in Stanley Field Hall, containing selected antiquities from China, has been reinstalled, the prehistoric painted pottery jar

presented by the American Friends of China occupying the center. The bronze figurine of a rhinoceros acquired from a fund donated by the same society and the two polo figures presented by Mr. David Weber (p. 362) have been added to the same case. The bottom of the case and the bases in it have been changed to light colors so that it now matches Case 11 in Stanley Field Hall, in which material from the excavations at Kish is displayed. The Sumerian clay head described under Accessions (p. 354) has now been placed with this exhibit.

One case at the north end of Edward E. and Emma B. Ayer Hall was rearranged. The two craters presented by Mr. Thomas S. Hughes this year and described under Accessions (p. 354) were added to the display of Italic pottery. New style labels were prepared for this case. The glass amphora recently presented by Mr. L. M. Willis has been added to the exhibits of antique glass in this hall. The backgrounds of four cases containing painted frescoes from Pompeii, as well as their black frames, were repainted in a light color. Labels for these frescoes were revised and reprinted in the new style.

Exhibits representing the ethnology of the Eskimo and Indian tribes of the Northwest Coast were transferred from Mary D. Sturges Hall into the larger Hall 10 occupying the entire east side of the building. This move resulted in a better geographical arrangement of the various cultures and a more advantageous setting of the group cases in the center aisle. The culture of the Kwakiutl is shown on the north and northwest sides of the hall, followed on the west side by the Haida, Tlingit, Nootka, and Bella Coola. The large group illustrating the interior of a Salish house occupies the south wall and is joined by a case of Salish ethnology on the east side. Running from south to north along the east side are the Eskimo, Northern Athapascans, Cowichan, Skokomish and Twana, Chinook and Wasco, Yakima, Klikitat, and Tsimshian, followed by two cases representing the complex decorative art of the Indians of the Northwest Coast.

The bays separating Hall 10 from the transverse halls have been efficiently utilized for a display of thirty totem poles, grave posts and house posts, which had heretofore not been shown since the Museum was moved into its present building. They are thus lined up in a continuous avenue running from north to south, and convey a vivid idea of these most imposing architectural monuments created by the North American Indians. As far as possible, they have been grouped in each bay in such a manner that they represent the tribe whose culture is illustrated in the adjoining exhibition cases. Two

totem poles have been erected against the south wall, and one on the northwest wall. One of these, from the Haida of Queen Charlotte Islands, is illustrated in Plate XXII. It formerly formed the doorway of a Haida house, and, as its owner was a member of the Raven clan, the raven is carved on this pole as his principal crest beneath the three watchers on top. In order to accommodate the pole in the available space, it is shown in two sections placed side by side.

Labels for all group cases in Hall 10 were revised, re-edited and reprinted in the new style; likewise the totem poles and house posts were each provided with a special label in large type. A new descriptive label was prepared for the group illustrating the Kwakiutl guessing game. Many improvements were made in the Salish house group which, on account of its size, had to be taken apart for moving and reassembled, and in the Eskimo sledge group, in which all furs were cleaned and the "snow" renewed.

Mary D. Sturges Hall is now reserved for North American archaeology and is in process of installation. At present it contains the group of three life-size Indians engaged in making stone implements, two cases representing the archaeology of the Hopewell Mound group, two clay altars from a mound near Chillicothe, Ohio, and a model of the Serpent Mound in Adams County, Ohio. These exhibits were formerly shown in James Nelson and Anna Louise Raymond Hall, which is now entirely given over to the Indian tribes of the Woodland area of North America. All cases in Raymond Hall, to the number of twenty-one, were completely reinstalled during the summer on buff-colored screens with new buff labels printed in black type. Sketch maps showing in red ink the habitat of each particular tribe are displayed in the case, beneath case labels. There is much fine, old and rare material displayed in this hall, of interest not merely to the ethnologist, but also to the art student and designer.

The reinstallation of Hall 5, devoted to the ethnology of the Plains Indians, begun in 1929, was concluded this year. Altogether twenty cases were reinstalled with buff-colored screens and numerous improvements in arrangement. All labels were revised and re-edited, and then reprinted in the newly adopted style.

In Hall 6, good progress has been made with the reinstallation of the west portion of the hall, which is allotted to the nomadic tribes of Arizona and New Mexico. Four cases illustrating basketry and household objects of the Papago and Pima, and war and ceremonial costumes and riding and hunting equipment of the Apache, have



MURAL PAINTING, RESTORATION OF PREHISTORIC ANIMALS AT THE LOS ANGELES TAR PITS

Ernest R. Graham Hall

Gift of Ernest R. Graham. Painted by Charles R. Knight

been placed on exhibition. An effective display of Navaho silver jewelry has been made in a six-foot case. It contains well-selected necklaces, bracelets, buttons, rings, buckles, and leather belts ornamented with silver disks. Also shown are molds, crucibles, dies, and matrices for stamping designs on silver ornaments. Navaho blankets and saddlecloths, to the number of one hundred, have been installed in eight cases, and are displayed in a very attractive manner. The mode of installing them has been varied in every case. Masks used in the Navaho Night Chant Ceremony were also installed. In the east half of Hall 6 two cases of Maidu and Miwok basketry have been installed and placed on exhibition.

Reinstallation progressed satisfactorily in Hall 8 devoted to Mexican and Central American archaeology and ethnology. Eleven newly installed cases have been placed on exhibition in this hall during the year. Old material has been carefully sifted, and new material added. Eight of these cases illustrate the daily life of the present Indian population of Mexico and Central America. Much of this material is now unobtainable, owing to the disintegration of native cultures in the face of industrial civilization. Another case contains antiquities from Nicaragua. These exhibits are illustrated by twenty-seven photographs, several of which are made from frescoes or paintings by such well-known Mexican artists as Diego Rivera and Covarrubias. Four other cases in this hall have been relabeled. All the casts of Maya monuments displayed in the hall were treated during the year by Modeler John G. Prasuhn with a new process, improving their appearance which now approaches very closely that of the originals. Casts of two magnificent Maya lintels from Yaxchilan were hung on the east wall, and, in close proximity, inside the east entrance, casts of two wall ornaments from a temple at the Maya city of Uxmal. These architectural ornaments are in the form of snakes' heads, in which are set human heads. Models of a large palace building from Mitla, Mexico, and of a pyramid at Uaxactun, described under Accessions (p. 354), were placed on exhibition in special cases. Finally a series of large photographs of Maya buildings and stelae, taken by Mr. A. P. Maudslay, were hung on the pilasters. It is hoped to add to their number in the near future.

One case of ethnological material from Peru and Bolivia was installed and placed on exhibition in Hall 9 during the year. A considerable amount of this material, which consists chiefly of costumes and fabrics of the Quichua and Aymara Indians, was

collected by Dr. A. L. Kroeber, Research Associate of the Department, during the course of the First and Second Marshall Field Archaeological Expeditions to Peru. Two walnut-finished bases were made for the stone seats from Ecuador which occupy the center of the aisle, and six cases in this hall were relabeled.

The Buddha statue presented by Mr. Lee Ling Yün has been placed with two others of the same type in Case 39, Hall 24. The carved rhinoceros horn presented by the American Friends of China is shown with the John J. Mitchell collection of rhinoceros horn cups in the same hall. The cloisonné-enamel statuette of a Tibetan church dignitary and an ancient vase of the same material, formerly shown in Stanley Field Hall, have been transferred to Case 23, Hall 24.

Rearrangements were made in eight cases of the gem room (H. N. Higinbotham Hall).

Wooden frames to the number of 277 were made for the exhibition of Coptic garments and fabrics, and the latter, which have been mounted on linen, were stretched over these frames.

In the modeling section of the Department a miniature carabao cart and eight human figures were made by Modeler Prasuhn for the Menangkabau village group shown in the center of Hall G (Arthur B. Jones Collection). Mr. Prasuhn built the leaf shelter and jungle background for the Pygmy fire-maker group in the same hall and the pit for the predynastic Egyptian burial. He retouched the model of the Casa Grande ruin in Hall 7, and refinished all casts of Maya monuments in Hall 8, by a new process of treating the surfaces with various colored sands and cement, which gives the casts almost the appearance of the originals. He painted nineteen casts of Egyptian statuary in the colors imitating the original—limestone, granite, black and red granite, diorite and basalt. The façades and interior of the Mitla temple model were painted and refinished by him. He reassembled the Salish house and Eskimo sledge groups, as it was necessary to take these apart in moving them from Mary D. Sturges Hall to Hall 10. He also made casts of two Egyptian inscriptions, and treated 197 bronze implements from Kish by means of the electrochemical process.

Five hundred and three objects were treated, repaired or restored by Mr. Tokomatsu Ito, who is in charge of special repair work for the Department. These comprise 97 antiquities from Egypt, 140 from Mesopotamia, 82 from America, 37 from China, 2 from Japan, 138 objects from Africa, 2 models of the Taj Mahal, 3 objects of European

archaeology, and 2 skulls. Mr. Ito also carved six stands for objects placed on exhibition.

Identification numbers marked on ethnological and archaeological objects during the year total 14,145.

Material in forty exhibition cases was poisoned during the year. Material stored in the poison room on the fourth floor was cared for in the usual manner and is in satisfactory condition.

Some important changes were made in the assignment of work and storage rooms. Room 55 has become the departmental study room. Melanesian material formerly stored in Room 55 was transferred to Room 35. Skulls and skeletal material were moved from Room 35 to Room 39, which formerly was the study room, and placed in new steel cabinets. The old wooden racks were discarded and replaced with steel throughout in Rooms 28, 30, 31, 33, 34, 35, 36, 36A, and 65. Thanks to the use of steel the shelf area is considerably increased, resulting in a much better arrangement of study and exchange collections.

BOTANY.—The installation of the economic botanical exhibits has been continued during the year by Assistant Curator James B. McNair. Attention has been given especially to wood distillation products, resins, and fibers.

All of the exhibits in Hall 25 are now supplied with new labels, those for spices and condiments and cassava starch having been added during 1930.

In Hall 28, devoted to industrial plant materials and their products, all of the old installations on a black background were removed to allow the repainting of the cases, which has been completed. About one-half of the exhibits in this hall have been reinstalled according to a revised plan. The exhibits thus far completed are mostly of the principal important fibers, such as cotton and other mallows, jute, ramie, flax, Sunn hemp, Manila hemp, bowstring hemp, and sisal. Some of the less common fibers are also included, as well as material for the manufacture of mats and cordage.

Other exhibits so far revised and reinstalled in Hall 28 are those of the products obtained by the destructive distillation of soft wood, products from the steam distillation of soft wood, turpentine orcharding, Japanese, Burmese, and Indian lacquers, gum resins, oleo-resins, and true resins. There is an extensive exhibit of copal resins which occupies two cases and contains some large, rare, and beautiful

specimens. Some of these show various inclusions, such as imprisoned bees and other insects, various forms of concretions, stalactite formation, stratified flow, and deposition. The exhibit constitutes one of the most important collections of resins in the United States.

Plans for the remainder of this hall provide for exhibits of tobacco, narcotics, drugs, cellulose products and artificial silks, paper and paper making, tanning materials, vegetable dyestuffs, cork, paint oils, soaps, waxes, peat, charcoal, rubber, chicle, gums, essential oils and perfumes.

In order to make available more space for the study collection of woods, the economic material stored in Room 16 has been placed in lockers in Halls 25, 27, and 28. The materials poisoned, bottled, labeled, and card indexed in 1930 were also stored in a similar manner in the lockers provided under the exhibition cases in the various botanical halls.

Progress was made with the rearrangement and reinstallation, begun early in 1929, of the Hall of North American Woods (Charles F. Millspaugh Hall) which contains all the most important lumber-producing trees north of the Rio Grande. This magnificent collection is designed to display the elements of the forest wealth of the United States and Canada. During the past year eleven new cases were installed. Some of the necessary wood specimens are still lacking but through the efforts of Professor Samuel J. Record, Research Associate in Wood Technology, who has planned the arrangement of this hall, much material required to complete the exhibits and to replace defective boards has been furnished by individuals and concerns in the lumber industry. Such contributions are mentioned in this Report under Accessions (p. 354).

The series of rare and tropical woods presented by C. H. Pearson and Son of New York and Mr. J. C. Deagan of Chicago, which was formerly on display in Stanley Field Hall, has been installed in the Hall of Foreign Woods.

A series of boards of twenty-five of the most commonly used woods of the Amazon, brought from Pará, Brazil, by the Marshall Field Botanical Expedition to the Amazon, has been prepared for installation in the same hall.

During 1930 the Herbarium has grown rapidly. Its scientific value has been greatly increased, particularly by the addition of several thousand photographs of type specimens of South American plants, and by fragmentary material of types and other historical



PACIFIC WALRUS

Hall of Marine Mammals (Hall N). Thorne-Graves Arctic Expedition
Taxidermy by Jonas Brothers. Background by Charles A. Corwin
About one thirty-second natural size

specimens. It now contains more than 622,000 mounted sheets of plants, and there are on hand probably 100,000 more, largely from the Old World, that are awaiting mounting before they can be incorporated.

Although a large part of the time of the plant mounter was required for preparing shipments of specimens and for other routine work, there were prepared for distribution into the Herbarium, by gluing and strapping, 23,000 specimens, a substantial increase above the number of the preceding year. The employment of an assistant plant mounter for the greater part of the year facilitated the mounting of most of the urgently needed current collections, especially those received from Peru. There still remains an accumulation of material from Central and South America that will be immediately useful when it has been distributed into the general herbarium and is available for consultation.

For three months the Custodian of the Herbarium was on leave of absence, but the position was filled temporarily. All specimens mounted have been distributed at once into the Herbarium, where they may be studied. Six new steel unit cases were installed in 1930. Three of them were placed in the general herbarium, to accommodate the increasing collections of flowering plants. Three others were placed in Room 4, which has been set aside for the herbarium of cryptogamic plants, and to these new cases there were transferred the ferns and certain other lower plants. These now are convenient of access, while in their former quarters it was almost impossible to examine the specimens because of the manner in which it was necessary to store them temporarily.

The staff of the Herbarium has determined many thousand sheets of current collections, so that they could be filed in their proper places in the Herbarium. In addition, the determinations of hundreds of specimens already distributed have been corrected. All mounted plant specimens are arranged in a single sequence, and thus it is possible to find any particular one in a moment. The only exceptions are the Illinois and Peruvian herbaria. The former is kept apart as a matter of convenience for the study of the state flora. The Peruvian collections, except for a few families already incorporated in the general herbarium, are being kept together temporarily, until they are no longer needed for the preparation of the *Flora of Peru*.

About 22,000 mounted sheets of plants were added to the permanent herbarium collections during the year. Most of these were South American plants, which improved greatly the Museum's

representation of the South American flora. The photographs and fragmentary material of type specimens that were added make the Field Museum Herbarium one of the best in the United States for the study of South American plants.

Particular mention should be made of the great increase in the collections of South American Rubiaceae, a result of special studies upon the group made by Associate Curator Paul C. Standley. The Museum has received thousands of specimens in this group from recent collections, many of them having been submitted to Field Museum for the purpose of obtaining identifications. In addition, great numbers of mounted sheets have been received on loan. Photographs were made of types and other important specimens, and in other cases permission was obtained to retain leaves or flowers when the material was sufficiently ample. Finally, photographs have been obtained of all the types of South American Rubiaceae in the herbarium at Berlin-Dahlem, and fragmentary specimens of other rare species. As a result, Field Museum now possesses what is undoubtedly the best collection of South American Rubiaceae to be found anywhere in the world. It contains some representatives of almost every species of the family that ever has been reported or described from South America.

In the Hall of Plant Life the only new material added during the year was a reproduction of a flowering branch of a papilionaceous vine (*Mucuna rostrata*) with large pea-like flowers of a brilliant orange-red color. The original specimen of this tropical liana was collected on the Tapajoz River by the Marshall Field Botanical Expedition to the Amazon. It was reproduced in the Stanley Field Plant Reproduction Laboratories of the Museum from the preserved specimen with the aid of color sketches, field notes, and photographs. Inasmuch as the entire staff of these laboratories has been occupied with the work incident to the paleo-botanical group (Carboniferous forest) which is to form a part of the historical geology exhibits in Ernest R. Graham Hall, the material secured for the exhibits of the Department of Botany by last year's expedition to the Amazon, has been kept in reserve for 1931.

GEOLOGY.—Reinstallation of all cases in the Department except those in Frederick J. V. Skiff Hall was completed during the year. In order that the work of painting the walls and ceilings of the halls and covering the windows on the north side of Hall 34 and south side of Skiff Hall might be carried on, most of the cases in all the halls

were moved away from the walls or to other positions. Some removal or change of position of specimens was necessary in nearly all the cases in order to prevent injury during the moving. After painting of the halls was completed, the cases were replaced and the specimens reinstalled.

In Hall 34, devoted to minerals and meteorites, the interiors of eight cases were painted and the specimens reinstalled. Six cases illustrating physical geology, together with two large slabs and one large concretion, were removed from the hall, and the west half of the hall devoted entirely to the exhibition of meteorites. A case was provided for the Paragould meteorite presented by President Stanley Field, and a base was made for one of the Navaho meteorites. The latter was installed without a case in order that visitors might more fully observe its physical characters. New descriptive labels were installed with the large meteorites. This part of the hall now contains thirteen cases of meteorites, the specimens being grouped according to composition and size.

Labeling of the systematic mineral exhibit was essentially completed, 2,539 labels being prepared and installed for this purpose. Label copy was prepared for 1,240 small specimens of meteorites, but only twenty-five of these have as yet been installed.

Thirty specimens were added to the William J. Chalmers Crystal Collection during the year, and were installed in the cases devoted to that collection in Hall 34. The massive large beryl crystal presented by Mr. Chalmers during the year was temporarily installed in Stanley Field Hall.

In H. N. Higinbotham Hall, the collection of gems presented by Mrs. Joseph W. Work in 1929 was placed on exhibition, the specimens being distributed according to varieties. The cut tourmaline presented by Mr. R. T. Crane, Jr., was also installed in Higinbotham Hall.

Four cases illustrating physical geology, and two large glacial slabs and a large concretion on individual bases, were moved from Hall 34 to Clarence Buckingham Hall. The physical geology exhibit, which had previously been divided between two halls, was thus consolidated. The specimens were removed from the cases which were added to Buckingham Hall, the case interiors painted, and the specimens reinstalled. A similar renovation was carried on for two other cases in the hall that had not been finished last year. The large mass of lodestone acquired during the year was installed in this hall, being placed on a base without cover in order that visitors may

have an opportunity to test the magnetism of the mass by nails and other fragments of iron which are provided.

Labeling of all the exhibits in this hall was completed, a total of 2,061 labels being provided and installed. Of these, 1,296 labels were for the systematic rock collection, the remainder for the cases of concretions, volcanic products, dendrites and other objects. Twenty-six of these labels were descriptive. In connection with all the reinstallations, a number of new specimens were added and the contents of nearly all the cases rearranged. To the case of volcanic products in this hall several specimens collected by the Marshall Field Expedition to New Mexico were added, the entire exhibit of these having been withdrawn from Stanley Field Hall. Of special importance among the added specimens were large masses of the rough lava called malpais, which show remarkable forms made by steam escaping during the lava flows, and a series, presented by Lieutenant-Commander W. J. Keester, of volcanic ash from the 1912 eruption of the Katmai, Alaska, volcano.

To the exhibit in the case showing a model of the Virginia Natural Bridge, a map of Virginia showing the location of the bridge has been added. A number of changes were made in the installation of the relief maps occupying the west end of the hall in order to give better lighting and more systematic grouping. New labels were made and attached to the maps, a total of thirty labels thus being furnished. All of these labels are descriptive. The model of the Moon in this hall was thoroughly cleaned and some portions of it were repainted.

In Hall 36, devoted to coal, petroleum and non-metallic minerals, the work of changing backgrounds and reinstallation begun last year has been completed. This involved emptying nineteen and reinstalling twenty-six cases. Although only four cases are now provided with the new style labels, label copy has been prepared for the whole hall and is in the hands of the printer. While most of the collections have been reinstalled essentially as they were, minor improvements and additions have been made. The crude petroleum exhibit has been materially enlarged by the addition of many specimens received from the United States Geological Survey and not hitherto shown. Space was secured for these by retiring two cases of obsolete material. The labeling of the petroleum exhibit has been amplified by the introduction of small maps giving the location of the fields from which the specimens were obtained. Studies carried on in conjunction with a representative of the Standard Oil Company (Indiana) have shown the possibilities of a new type of exhibit

which will illustrate the applications and uses of petroleum in a more attractive and educational manner than the present one. Such an exhibit is now being prepared by the Standard Oil Company (Indiana). The model in this hall of the original Rockefeller oil refinery at Cleveland, which has been exhibited since the founding of the Museum, was in need of renovation and accordingly was repaired and repainted. Through the good offices of the Standard Oil Company (Indiana), a description of some missing parts was secured from a former employe of the refinery and these parts were modeled and added to the exhibit. Full repairs were also made to the model of the Chandler iron mine in this hall. This had suffered from depredations by souvenir hunters. An iron railing has been placed about the model and this will, it is hoped, prevent further injury of this sort.

The cement collections, which occupy two cases, have been completely revised upon new lines. They now show in synoptic form all the structural cements which are in large use in different parts of the world and these are followed by as large a collection of cement rock, portland cement and concrete as space has permitted. The new silica collection, which occupies three cases, has been revised and enlarged, as has also the bentonite collection.

The large collection illustrating the technical classification of soils as devised by the United States Department of Agriculture has been retired from exhibition, and is replaced by a collection illustrating varieties of peat and other features of a single peat bog. This collection has been installed above the model of a peat bog, so that comparison of the specimens with the model may readily be made. Both the case containing the model and that containing sulphur and magnesite have been transferred to Hall 36 from the adjoining corridor. In the magnesite exhibit a bar of metallic magnesium has been given a special installation designed to call attention to the lightness of this metal. It is shown on a balance, poised against a piece of iron of equal weight, but of much smaller size.

In Frederick J. V. Skiff Hall the work of changing backgrounds and reinstallation which was begun last year has been continued and has made good progress. Already twenty of the cases in this hall have been reinstalled. These include five cases of salts and exhibits illustrating salt extraction methods, four of marbles, two of gypsum, two of building stone and one each of mica, asbestos, phosphates, fluorite, barite, granite and alabaster. New labels to

the number of 826 have been provided for these exhibits. Of these, forty-one are descriptive. While the new installation of the marble, building stone and some other exhibits is the same as before, in many others changes have been made. New material has been added and old retired, and some exhibits were enlarged while others were reduced. The locations of the asbestos and phosphate collections in the hall have been interchanged so as to facilitate the work of the guide-lecturers. Many of the cases in this hall have a deep, low exhibition space for displaying large specimens. Where the serial arrangement requires the introduction of small specimens, screens have been provided for this part of the case in the new installation. These screens are placed four inches from the glass and thus bring the specimens near the eye of the observer. Also, to bring the labels of the large specimens near the eye, elevated label holders are used. The general descriptive labels, too, have been installed in this part of the case close to the glass, since the lighting and slope of the glass are conducive to easy reading. Special installation was provided in the hall for the ten-foot core of granite presented by the Sullivan Machinery Company, of Denver, Colorado.

In Ernest R. Graham Hall the second of the three-dimensional restorations being made by Mr. Frederick Blaschke has been installed. This group, a gift from Mr. Ernest R. Graham, is a life-size restoration of the small, three-toed horse, *Mesohippus*. So far as known these are the first life-size restorations of individuals of a species of extinct mammals other than man, that have ever been undertaken. It is also the first time that restorations have been made with superimposed hair on the models. In spite of the unusual nature of the undertaking, the restoration was performed with remarkable success and a very life-like appearance of the animals has been obtained. Careful studies made on fossil skeletons of *Mesohippus*, comparison with the anatomy of related modern animals and consultation with leading paleontological authorities, all were carried on during preparation of the group in order that as great accuracy as possible might be attained. The group is composed of five individuals of *Mesohippus*, including representatives of both sexes and a young animal. The painted background is a reproduction of a scene in the Black Hills of South Dakota, where these animals are known to have lived. Grateful acknowledgments are especially due to Professor Henry Fairfield Osborn, President of the American Museum of Natural History, and the late Professor William Diller Matthew, of the University of California, for valuable advice and

cooperation in the preparation of the group. Besides the installation of this group, Mr. Blaschke made considerable progress in the construction of what is to be the central group in the series. This is to be a representation of the animals of nearly elephantine size known as Titanotheres.

Great progress was also made during the year on the many reconstructions of fossil plants required for the Carboniferous forest group in Graham Hall. Last year saw the completion of the large calamites that form an important element of the group and of the numerous trunks of the giant clubmosses representing various species of *Sigillaria*, *Lepidodendron*, and *Lepidophloios*, that constituted the bulk of the forests of the time. The present year has seen the completion of most of the mass of foliage required to give an idea of the truly luxuriant vegetation of the age. An entire tree of *Cordaites* (*C. borassifolia*) has been reconstructed, its details being based on fossils in the Museum's collections, and another of *Lepidodendron* (*L. obovatum*). The former measures some sixteen feet in height, the latter but little less. This species of *Lepidodendron* was selected as being one of the most completely known, thanks to a large series of fossils showing all of its essential characters, stem-markings of trunk and branches, foliage, and male cones.

The ferns which were so abundant in Carboniferous forests will be represented in the group by two tree ferns: one, the characteristic *Megaphyton*, with a two-ranked, fan-like disposition of its leaves; and another, *Caulopteris*, of the more usual type of stem, bearing at its tip a large crown of pinnately branched fronds. Reconstructions of both of these have been completed during the year.

Much of the fern-like foliage of the Carboniferous period was not that of the true ferns, but of a large group of now entirely extinct fern-like seed plants with characters intermediate between ferns and the cycads that appeared much later. These have been called Cycadofilices, or Pteridosperms, or, more simply, but less correctly, seed-bearing ferns. Some of these are so well known that they may be reconstructed with considerable confidence with the aid of fossils which are now in the Museum collection or those placed at the disposal of the Museum by Professor Adolf Carl Noé, of the University of Chicago. In conjunction with these, the results of the work on plants of this group by the well-known paleo-botanists, Scott, Knowlton, Kidston and many others who have studied these plants, were utilized. In the Graham Hall group the seed ferns will be represented by *Neuropteris heterophylla*, *Neuropteris decipiens* and

Lyginodendron oldhamnium. A splendid reconstruction of the first mentioned of these is practically complete, the second is well advanced, and the third is under way.

A beginning has finally been made on the last group of plants to be included, *Sphenophyllum*, about the habit of which there has been much difference of opinion. A species abundant in North American remains of this period has been selected to represent this entirely extinct order of plants and for the purposes of the group will serve to complete the assemblage of restorations of Carboniferous plants which with its painted background will soon form an important feature of the exhibits in Graham Hall. With the permission of President Stanley Field, the laborious work for this group is being carried on in the Stanley Field Plant Reproduction Laboratories of the Department of Botany. In this connection it is desired to express hearty appreciation of the generous cooperation of Professor Adolf Carl Noé, the chief authority in the United States on the plants of the Pennsylvanian period, and of the unfailing interest with which he has aided the execution of this project, both by his advice and by the loan of literature and specimens from the collections of fossil plants in the Walker Museum, of the University of Chicago. The collection of Pennsylvanian fossils acquired in 1928 from a large series of duplicates of the United States National Museum has also been of great assistance in the work, and Field Museum highly appreciates the kindness of Head Curator R. C. Bassler of that institution in aiding it to obtain the use of this collection. Acknowledgments are also due Mr. Bassler for the loan through the United States National Museum of valuable specimens of *Lepidophloios* and *Caulopteris*, which have been of great service in furnishing details for certain of the restorations.

Painting of a background for the Carboniferous forest group has been carried on by Staff Artist Charles A. Corwin in conjunction with installation and other work on the group.

Of the mural paintings being executed by Mr. Charles R. Knight of New York, seven were completed and installed in the hall during the year. Six of these are twenty-five feet by nine feet in size, and one is ten feet by nine feet. The titles are as follows: Prehistoric Life at the Los Angeles Tar Pits, the Cave Bear, Lower Miocene Mammals, Plesiosaurs and Ichthyosaurs, Upper Miocene Mammals, Permian Reptiles, and a Devonian Forest. The completion of these paintings leaves only five to be added to finish the series of twenty-eight, and there is every reason to expect that this will be accom-

plished during the coming year. The series is a gift from Mr. Ernest R. Graham.

To the exhibition series a complete fossil fish-lizard obtained during the year was added. This is a specimen of a comparatively young individual about four feet in length and shows not only the skeleton in every detail, but also a clear impression of the fins and skin. Some of the specimens of South American vertebrate fossils in the hall were remounted and reinstalled, these being chiefly skulls of *Nesodon* and *Hapalops*. Sketches representing the probable appearance of some of the animals while living were installed in proximity to the fossil specimens. A model of a restored head of *Pronothrotherium*, and a specimen of the dermal armor of one of the large fossil ground sloths were added to the exhibit of South American fossils. All the larger exposed skeletons in the hall, viz.: those of the Mammoth, Mastodon, great Dinosaur, ground sloth and Irish deer were carefully and thoroughly cleaned with a vacuum cleaner, following the completion of the painting of the hall. Several readjustments in the positions of the cases and exhibits were made in order to allow the introduction of a case to contain a group of ground sloths now being prepared.

In addition to the labels, some of which were installed last year, showing the succession of geological periods, ten more were prepared and placed in the cases. These enable the visitor to obtain a correct idea of the period of time at which the animals and plants, fossils of which are shown in each case, lived. The case in which a complete skeleton of the Titanotherium, *Allops*, has been displayed, was remodeled and a single large light of glass is now used to replace the two previously employed. The artificial lighting of the case was also modified.

Transfer of the remainder of the exhibit of invertebrate fossils from black to buff tablets was completed during the year, 4,408 specimens being thus transferred. The tablets were then reinstalled, completing the installations of this character in the hall. A total of eight of these cases was installed during the year as follows: three cases of Mississippian fossils, one of Pennsylvanian, one of Pennsylvanian and Permian, and three of Jurassic age. Thorough revision of the nomenclature of the specimens installed was carried on by Assistant Curator Sharat K. Roy previous to their installation.

In the Paleontological Laboratory the preparation of vertebrate fossils from South America has engaged chief attention. The work has essentially been divided into two parts: (1) preparation and identification of fossils; and (2) preparation and mounting of two

complete skeletons of the large ground sloth, *Scelidodon*. In the preparation of the systematic series of fossils more than 200 specimens have been freed from matrix and made ready for identification and study. Determination and full records of most of these have been made by Assistant Bryan Patterson. Specimens suitable for exhibition were installed in Ernest R. Graham Hall, while the others were set aside for study. Before assembling and mounting the skeletons of the ground sloths it was necessary to prepare the bones so that they might be durable. These skeletons were collected by the Marshall Field Paleontological Expeditions from the Pleistocene formation of southern Bolivia and occurred in a layer of dry, sandy clay which made the bones soft and fragile. It was therefore necessary to harden them sufficiently to give them the strength essential for mounting. For this purpose, the bones were individually impregnated with a solution of bakelite varnish and then baked to hardness in an oven which was specially constructed for the purpose as described elsewhere. As there were two skeletons it was decided to install them as a group. A miniature model to scale of the group was first prepared, and mounting of the skeletons carried on according to that design. One skeleton, that of a large male, was mounted in the position of an animal digging in the ground for the roots and tubers upon which these animals are supposed to have fed. The second skeleton, apparently that of a female of the same species, was mounted standing on its hind legs, balanced by its short stout tail, while the forelegs rest upon a branch of the algaroba tree, upon the leaves and seed pods of which it is supposed to be feeding. In mounting the skeletons, aluminum rods were used as far as possible in place of steel, on account of their light weight. Moreover, pains were taken to conceal all metal supports within the bones so far as possible. Preparation and mounting of the skeletons was finished during the year and their installation awaits only the construction of a supporting tree and preparation of some accessories.

The study collection of fossil invertebrates and plants was made available for greater service by the opening and distribution of the contents of 101 large boxes containing fossils which had remained inaccessible since their removal from the Museum in Jackson Park. Several thousand specimens were unpacked, cleaned, classified both biologically and in accordance with geological time and in this order placed in trays in the cabinets in Room 120. At present they occupy 600 trays and easy examination of any specimen can be made

at all times. Specimens deemed of no further use either because of poor quality or imperfect identification, were discarded, about 2,000 being thus eliminated.

In the chemical laboratory much of the time of Associate Curator Henry W. Nichols has been given to the electrolytic treatment of ancient bronzes from Kish and Egypt. As these bronzes are valuable, and many were in a state that made prompt treatment necessary to forestall serious damage, their treatment has been given first consideration even though other work had to be deferred. During the year, 209 bronzes belonging to the Museum collections, many of which were badly corroded, have been successfully treated. In addition, two valuable bronzes from Assyria which were in unusually bad condition were treated for the Haskell Museum of the University of Chicago. As additional experience has been gained, the electrolytic process has been used more successfully than ever in this work.

Other investigations and analyses carried on in the chemical laboratory, for the Department of Anthropology, included analyses of three antique copper objects, an investigation of the filling of an Inca tooth, analysis of an efflorescence on ancient pottery from Yucatan, and determination of the modern weights of a large series of ancient Egyptian weights. For the Department of Geology, three partial analyses were made of meteorites and pseudo-meteorites. For general Museum purposes, two determinations of the heating value of samples of coal submitted for Museum use were made, an investigation as to the durability of a new type of wall covering intended for use in the Museum lavatories and boiler room was completed, methods of oxidizing bright brass fittings on Museum furniture were devised, and the quality of a paper intended for use in Museum publications was tested. Investigations and experiments were also made by Curator Oliver C. Farrington and Associate Curator Nichols with a view to determining the best design for a contemplated exhibit of fluorescent minerals. Exhibits of this character elsewhere have not been wholly satisfactory, but it is expected that it will be possible by sufficient study to devise a plan that will avoid the defects, while retaining the good features, of other exhibits of this kind. The chief object of these studies is to reduce the cost and increase the permanence of the exhibit.

A motor-driven apparatus for concentrating and cleaning microfossils, based upon a similar apparatus used by agricultural chemists, was designed by Associate Curator Nichols and constructed in the Department. Through its use, Assistant Curator Roy has been

greatly aided in the study of the micro-fossils which he collected in Baffin Land while a member of the Second Rawson-Macmillan Subarctic Expedition (1927). Making and mounting of thin sections of invertebrate fossils, by the aid of the combined cutting and grinding machine installed in 1929, was carried on during the year, and a number of specimens which could not have been identified from external appearances alone were readily determined as soon as their internal structure was revealed by the sections.

In cooperation with Preparator P. C. Orr, Associate Curator Nichols carried on an extensive investigation as to the best methods of impregnating vertebrate fossils with bakelite for hardening and preserving purposes. As a result of these investigations, satisfactory methods were developed and are now in use in the paleontological laboratory. In connection with this work, provision of a large, constant-temperature, drying oven became necessary, and this was accordingly designed and built in the Department. It is a steam-jacketed gas-heated oven on the lines of the ordinary steam-jacketed constant-temperature oven of the chemical laboratory, but incorporating changes to suit it for its intended use. An oven of galvanized iron, measuring twelve by twenty-four inches inside, is enclosed in a larger galvanized iron box which serves as a steam jacket. The entire front of the inner oven is in the form of an asbestos insulated door, which, by the use of stiffening members and suitable fastenings, hermetically closes the oven. The entire outer part, except the bottom, is insulated against the escape of heat by a thick coat of asbestos cement. An inch of water is maintained on the floor of the outer or jacketing box by a simple constant-level apparatus at the side, through which a small stream of water flows. Steam from the boiling water heats all sides of the inner oven, and a constant temperature of 94°C. is maintained. The inner oven is provided with small vents for introduction of a thermometer and for ventilation. The steam escapes from the outer box through a vent in a corner. After the oven was put in operation it was found that the escaping steam moistened the air of the room enough to interfere with the use of plaster, so a simple reflux condenser was designed, built and attached and all escape of steam was thus avoided.

All the books in the Department library were thoroughly cleaned.

ZOOLOGY.—The preparation and installation of habitat groups of large mammals have continued at the same high rate established in recent years. Four large groups were finished and opened to the

public during the year. The animals shown are the giant panda, the northern sea-lion, the Pacific walrus, and the South American marsh deer.

The giant panda group (Plate XXX) has as its basis the animal killed by Messrs. Theodore Roosevelt and Kermit Roosevelt during the William V. Kelley-Roosevelts Expedition to Eastern Asia for Field Museum in 1928-29, referred to in the Report for 1929. This specimen, the first really complete one to reach any museum and the first actually killed by white men, has been supplemented by another obtained by the Roosevelts through barter with natives, which produces a pleasing and natural arrangement showing two animals instead of one.

The pandas are placed in an excellent representation of their favorite habitat of bamboo thickets which in western China are found growing at altitudes of 10,000 feet and more. One of them is seen feeding on the twigs and stalks of bamboo which seem to furnish their principal diet, and for crushing and chewing which their extraordinarily heavy teeth have doubtless been developed. They have been skillfully prepared by Taxidermist Julius Friesser, and a background of unusual beauty has been painted by Staff Artist Charles A. Corwin. The group is situated in one of the four central cases of William V. Kelley Hall where it is exceptionally well displayed and visible not only from that hall but also from adjoining halls and passages on either side.

The group of the northern or Steller's sea-lion (Plate XXXIII) is the first to be completed of the fine series of habitat groups of marine mammals projected for Hall N on the ground floor of the Museum. It occupies the commanding central position on the west side of this hall to which there is a long dignified approach by the stairway leading down, west of the center of Stanley Field Hall. It is the largest animal group so far installed in the Museum, occupying a space forty feet in width and seventeen feet in depth. The graceful lines of the animals, thirteen of which are in the group, and their rich coloration, combined with the bright tones of an expansive seascape, provide one of the most attractive pictorial effects yet produced in the Museum.

The specimens for the sea-lion group were collected and prepared by Taxidermist C. J. Albrecht, who made an expedition to the coast of Washington several years ago expressly to obtain the material and life studies necessary. The background, painted by Mr. Corwin,

is a faithful representation of the actual locality from which the animals were secured.

The group of Pacific walrus (Plate XXXVII) forms another important feature of the hall of marine mammals. The specimens for this group were collected and presented by Mr. Bruce Thorne of Chicago and Mr. George Coe Graves II of New York, principals of the Thorne-Graves-Field Museum Arctic Expedition of 1929. Field Museum is indebted to them not only for the specimens but for a generous contribution covering a large part of the cost of preparing the group. Seven animals are included in the group, one large bull, two younger males, two adult females, and two partly grown young. The ponderous beasts are shown huddled together in their usual manner on an Arctic ice floe, the old bull with his head raised, the cows literally overlapping each other, and the young ones clambering over them. The polished ivory of the formidable looking tusks glints in the subdued rays of a midnight sun cleverly devised to mingle with the background of ice and snow. The entire effect is one of striking interest, and the group stands as one of exceptional individuality. The taxidermy of the walrus group was done by Jonas Brothers of Mount Vernon, New York. The group was installed by Mr. Albrecht, and the background and light effects are by Mr. Corwin.

The group of South American marsh deer (Plate XXV) is the first of several South American groups planned for the western end of Hall 16. The specimens for it were collected by Mr. Colin C. Sanborn, Assistant in Mammalogy, as part of the work of the Marshall Field Brazilian Expedition of 1926-27. Five animals are shown amid the tall grass under the uncertain shade of a palm tree. The scene represented is that of one of the great *pantanales* so characteristic of central Brazil, a vast, level, grassy swamp, dotted here and there with low bushes in clumps, from each of which rise a few slender but towering palms. The species is the largest of South American deer, mainly of a rich tawny color, and it makes a beautiful subject for group treatment. The taxidermy is by Mr. Leon L. Pray, with background by Mr. Corwin.

An important addition to the systematic exhibit of mammals is the white rhinoceros, largest of extant rhinoceroses. A reproduction of this animal in cellulose-acetate by Taxidermist Leon L. Walters was finished and placed on exhibition in Hall 15. It is a very fine example of museum technique and has the double advantage of faithfully portraying nature and of preserving the skin of an animal

now probably approaching extinction. The specimen used in the preparation of this exhibit was obtained by Messrs. H. B. Conover, R. H. Everard, and John T. Zimmer during the Conover-Everard Expedition to Tanganyika Territory in 1926-27. Field Museum is greatly indebted to British officials, whose permission to take the specimen was courteously granted.

In George M. Pullman Hall improved installation was begun with the retirement of two old-style cases and recoloring of the floors of the cases.

In continuation of the revision and improvement of the systematic exhibit of North American birds, two cases of song and insectivorous birds were installed during the year, adding greatly to the general appearance of Hall 21. One of these cases contains finches, sparrows, tanagers and allied birds totaling 128 in number. Each is on a natural perch, and here and there accessories have been introduced, giving interest and variety. The second case contains warblers, thrushes, kinglets and related species, and the two sides of the screen accommodate 145 specimens. It has been necessary to some extent to utilize old mounts, but so far as possible fresh birds have been secured on recent field trips by Taxidermist Ashley Hine and especially prepared by him for mounting.

The reorganization of the systematic exhibit of reptiles and amphibians undertaken last year was continued in the west division of Albert W. Harris Hall. A symmetrical arrangement in ten new cases was completed with a final case containing an African python and three monitor lizards. The groundwork for these cases was made and the installation carried out by Associate Curator William J. Gerhard with the assistance of Mr. E. J. Liljeblad and Mr. Walters.

A striking addition to the reptile exhibits is a cellulose-acetate reproduction of the "dragon lizard of Komodo," as the giant monitor collected by the Chancellor-Stuart-Field Museum Expedition to the South Pacific (1929-30) has been called. This animal is shown in an alert attitude on a special base occupying an entire case. The Komodo lizard is by far the largest true lizard now existing, and Field Museum is greatly indebted to Mr. Philip M. Chancellor for his interest and perseverance in securing so notable an addition to the hall of reptiles. Another new exhibit, also a fine reproduction in cellulose-acetate, is that of the large prehensile-tailed skink of the Solomon Islands, based on specimens collected by the Cornelius Crane Pacific Expedition of Field Museum. Both of these exhibits were prepared by Taxidermist Walters.

In the systematic exhibit of fishes, eight new specimens were introduced into cases previously installed. All of these are reproductions in cellulose-acetate prepared by Taxidermist Arthur G. Rueckert. Among them are specimens of the long-horned sculpin, the batfish, and the sea robin, the last two prepared from specimens received in fresh condition from the John G. Shedd Aquarium. Great progress has been made in the preparation of fishes and accessories to be used in undersea groups projected for Hall O on the ground floor of the Museum. Four large sharks and many small fishes have been finished, and the intricate work of installing them among huge corals has begun. Progress has been made also in preparing for exhibition a large number of tropical fishes collected in the Pacific Ocean by the Crane Pacific Expedition.

Improvement in the exhibit of invertebrates in Stanley Field Hall was made by the installation of a wall case with buff-colored instead of black background.

The condition of the reference or study collection of mammals was greatly improved by the addition of sixteen new metal storage cases making it possible to retire permanently all the old-style tin cases of small size. The collection of mammals, therefore, although still slightly crowded, is in better order than for a number of years, notwithstanding the large number of recent accessions. Skins of large mammals were removed from the ground floor and arranged in the new skin storage rooms on the gallery above the main taxidermy shop. Skulls for these large skins also were taken from storage on the ground floor and placed in classified position in the new steel storage cases on the west corridor of the fourth floor. Although in large part not yet cleaned, they are now accessible and separated into related groups. Considerable progress was made in dressing raw skins of large mammals and in "making up" salted skins for permanent preservation for reference. All such material was overhauled, reclassified, and arranged for disposition in systematic manner.

Eight new steel storage cases were received in the Division of Birds, serving to relieve immediate congestion in the collection. So far as possible a system of classification was followed in arranging new accessions in connection with cataloguing and labeling. One hundred and twenty flat skins of birds from expeditions were made into cabinet specimens, and various damaged skins were repaired.

In the Division of Fishes, wooden storage stacks were replaced by modern adjustable steel shelving. A carefully classified arrangement of the fish collection was planned and much progress made in



BRONZE BEAKER FOUND AT KISH, MESOPOTAMIA

Completely covered with a coat of green patina

About one-half actual size

putting it into effect. The task of replacing the bottled fishes on the shelves in classified order is now about half finished.

Three two-faced steel cabinets with 276 glass-topped drawers arranged in twelve tiers make it possible to begin the collation of the Museum's several collections of insects, and to arrange them in systematic order, thereby assuring their preservation and making them more accessible.

No additions were made to the osteological exhibits during the year. The skeleton of a gibbon was prepared for use in a proposed rearrangement of the exhibit of the skeletons of Primates. Practically all skulls of small mammals on hand, 1,286 in number, were cleaned, and progress was made in organizing the care and classification of osteological material. Skeletons of seven mammals and four birds were prepared for reference, and skulls of seven alligators, three turtles, and two fishes were cleaned.

THE N. W. HARRIS PUBLIC SCHOOL EXTENSION

During 1930 the number of schools and other institutions regularly served with cases from this Department increased from 408 to 430, and the number of cases completed from 1,123 to 1,176 (Plates XXVI, XL).

In addition to the construction of these fifty-three new cases, eleven cases were completely reinstalled, and thirty-six partially reinstalled. All other cases were thoroughly inspected and cleaned, and 556 were repaired.

The color of the labels has been changed from black with silver printing to buff with black printing to coincide with a similar change adopted for labels within the Museum. The buff labels have been used on all cases completed in 1930, as well as being used to replace black labels on many previously constructed cases.

The two motor trucks have traveled more than 12,000 miles in this period. They have made 8,636 deliveries of from two to twenty cases each, with no cost or trouble to the institutions receiving the cases. In addition to the bi-weekly delivery and collection of cases at each of 430 schools and other institutions on the regular routes, special exhibits were sent as follows: four cases to the booth of the Wild Flower Preservation Society in the Hotel Sherman; four cases to the Fourth Annual Garden and Flower Show held in the Chicago Stadium; three cases to the booth of Community Sanitation

at the Chicago Health and Education Exposition; six cases to the summer session of Loyola University at St. Ignatius School; and twelve cases to Camp Algonquin of the United Charities of Chicago. A booth with twenty cases was maintained at the International Live Stock Exposition in the Union Stock Yards.

In the period under review, Acting Curator Cleveland P. Grant visited 118 schools served with Harris Extension cases to gain a better understanding of the needs and desires of the schools for visual education in natural history, and to give instruction in the use of the cases.

At the close of the school year in June an unprecedented number of letters of appreciation of the service rendered by this Department were received. Hundreds of principals, teachers, and students expressed their gratitude for the cases sent them throughout the school year, and their anticipation of the new cases that would come with the opening of school in the fall.

The sudden death on June 17, 1930, of Walter H. Beardsley, Preparator for this Department since 1919, was a great loss to it.

ART RESEARCH CLASSES

The art research classes, composed of students enrolled at the Art Institute of Chicago who receive special instruction at Field Museum from Mr. John Gilbert Wilkins, an instructor on the Art Institute faculty, have shown progress in the artistic merit of their productions ever since the classes were established seven years ago. During the last year the work accomplished by these students surpassed that of any previous year, according to Mr. Wilkins. Professional standards were approached by the work of the classes as a whole, and several individuals attained high points of self-expression and fine art quality. Each member of the classes is encouraged to work in his own style and in the medium in which he wishes to perfect himself. Some of the students devote themselves to sculpture, some to mural paintings, some to illustration, and some to decorative design work.

The second and revised edition of the book *Research Design in Nature*, compiled by Mr. Wilkins, is ready for publication. It contains 268 plates (including eighteen color plates) of work done by Mr. Wilkins' students based wholly on subjects covered by exhibits in the Museum. It is widely used for educational and reference purposes.

DIVISION OF PUBLIC RELATIONS

Because of the time it was necessary to devote to the newly established *Field Museum News*, the monthly bulletin for Members of the Museum, and due to the fact that the Museum's expeditionary activities, which are usually one of the principal factors in obtaining newspaper publicity, were in 1930 considerably reduced in extent and in spectacular features as compared with the several years preceding, there was some decrease in the amount of general publicity the Museum received during the past year as compared to 1929.

Distribution of information through the daily press continued to be the principal phase of the Museum's publicity, and the number of articles prepared at the Museum and published in the newspapers averaged about six a week. In addition many articles by members of the newspaper staffs and other outside writers augmented the amount of publicity received. As in previous years, publicity efforts were concentrated chiefly on the newspapers of Chicago and vicinity, but through the cooperation of news agencies the Museum's activities have received nationwide attention. Likewise, international circulation has been given the more important news emanating from the Museum, as is testified by clippings received from almost all parts of the world.

Magazines and periodicals of various types, as well as the newspapers, have evinced keen interest in news from the Museum and have devoted much space to it. Various organizations have again placed valuable advertising space at the Museum's disposal gratis. The public has been reached also through radio broadcasting of Museum news; through motion picture newsreels taken in the Museum; and through the distribution of direction folders and other printed matter prepared to attract visitors.

FIELD MUSEUM NEWS.—The first number of *Field Museum News* was issued in January, and it has been published each month since then. This bulletin was established for the purpose of announcing, reporting, and permanently recording all activities of the Museum, and of serving every Member of the Museum by keeping him in continual touch with these activities. In addition, *Field Museum News* serves as an exchange unit between this and other scientific institutions, and as an additional medium for conveying information to the press in general, many copies being sent to editors of newspapers and magazines with the result that numbers of its articles have been reprinted or quoted in part.

While *Field Museum News* has but limited space, it has been the constant endeavor to put into each number a great amount of timely information regarding the activities of the Museum and its expeditions, announcements of current events such as lecture courses and children's programs, the installation of important new exhibits, and brief articles on interesting scientific subjects of a nature not available for the most part in other periodicals which Members read. The publication of attractive pictures has also been given much attention. A feature during the first year which it is believed will be of value to readers who make bound volumes or keep scrapbooks, has been the publication serially of a brief history of Field Museum, which was written by Dr. Oliver C. Farrington, Curator of the Department of Geology, who has served the Museum as a curator since its earliest days. The paper has been carefully edited with the definite aim of conserving the readers' time by giving the greatest amount and variety of information in the briefest adequate form. The staff of the Museum has given hearty cooperation by contributing to the columns of the *News*. Printing and distribution routine has been maintained on a schedule insuring prompt delivery of the bulletin to all Members about the first of each month.

NEWSPAPER PUBLICITY.—The Division of Public Relations released a total of 303 news stories during 1930, or an average of approximately six each week. In addition, some 156 brief "filler" items were distributed to the press, thus bringing the total of notices, including regular articles and short items obtained for the Museum by its own direct efforts, up to 459.

Copies of this publicity matter were furnished to the seven principal daily newspapers of Chicago; to some sixty community and neighborhood papers published in the city; to more than fifty Chicago foreign language newspapers; to about sixty suburban newspapers covering the principal suburbs, cities and towns within a 100-mile radius of Chicago; to all the principal national and international news agencies; and to the Springfield bureau of the Associated Press for its special service to newspapers throughout the state of Illinois, which is in addition to the national distribution effected through the Chicago office of the same organization.

Many of the publicity stories were accompanied by photographs, prints from 166 negatives having been released by the Museum. Copies of each of these photographs were furnished to a list of twenty-five leading newspapers and news photograph agencies, through which hundreds of additional copies were distributed to newspapers



NORTHERN SEA ROBIN (*Prionotus strigatus* Cuvier)

Systematic exhibit of fishes (Hall 18)

Reproduction in cellulose-acetate by Arthur G. Rueckert

One-half natural size

all over the world. Newspapers publishing rotogravure sections have made splendid use of many of these photographs, thus providing an extra-desirable type of publicity.

Especially effective publicity was a full page of color reproductions of some of the paintings made by Mr. Walter A. Weber while he was a member of the Cornelius Crane Pacific Expedition, which was published in the *Chicago Sunday Tribune* of January 12.

The contract with the *New York Times* whereby photographs resulting from certain Field Museum expeditions are syndicated nationally, through Wide World Photos, was continued as in past years.

Frequently, as in other years, news from the Museum has been the basis of editorial comments by many important newspapers in all parts of this country, and occasionally abroad.

The great majority of the Museum's releases were news stories of from one-half to two-thirds of the average newspaper column. Others ranged from a column to items of fifteen to fifty words. Practically every story released was printed in several Chicago newspapers, and many in all; and the majority received extensive space throughout the country. As has happened in the past, newspaper staff writers have frequently expanded these releases into half-page and full-page Sunday feature articles.

The success of the Museum's publicity efforts is largely dependent on the cooperation of the press, and for their generosity in this respect grateful recognition is herewith accorded the *Chicago Tribune*, the *Chicago Daily News*, the *Chicago Evening Post*, the *Chicago Evening American*, the *Chicago Herald and Examiner*, the *Chicago Daily Illustrated Times*, the *Chicago Journal of Commerce*, and the national and international news agencies such as the Associated Press, United Press, International News Service, Universal Service, and Science Service.

Indicating the extent of the newspaper publicity received, the records show that an average of 1,628 clippings of articles mentioning the Museum was received each month in 1930. This number represents only a part of the actual total number of articles about the Museum, as no complete coverage of even the English language newspapers is available, and certain groups, such as the foreign language papers, are not covered at all by the clipping bureaus. The total number of clippings received for the year was 19,537.

PUBLICITY IN PERIODICALS.—Repeating the experience of past years, the Museum and its activities have been the subject of numerous special articles which have appeared in general and popular magazines, trade journals, scientific publications, and other periodicals. Of these, some were prepared at the Museum on the request of editors, and others were written by outside writers. They were usually illustrated with photographs furnished by the Museum and based on data supplied by the staff. Among some of the more important publications in which this material has appeared are *Scientific American*, *Chicago Commerce*, *Science*, *Popular Mechanics*, *Popular Science*, *Americana Annual*, *International Year Book*, *Science News Letter*, *L'Illustration*, *Illustrated London News*, *Museums Journal* (London), *Chicago Visitor*, *Rocks and Minerals*, *American Weekly*, and *Sunday Magazine of the New York Times*.

ADVERTISING.—As has been the case in previous years, space in various advertising media has been given to the Museum, free of charge. From a half-page to a page of advertising space in each program of practically all Chicago theatres (exclusive of motion picture houses) was given the Museum by the Clyde W. Riley Advertising System, publishers of *The Playgoer*, the magazine program. This is a courtesy which has been extended to the Museum year after year.

Likewise, advertisements in the programs of the Chicago Civic Opera Company were given the Museum in 1930, as has been done for a number of years.

The long-standing generous cooperation of the Chicago Surface Lines in printing at its own expense and displaying in the street cars colored placards calling attention to striking exhibits at the Museum, was continued.

The Illinois Central Railroad and the Chicago and North Western Railway, which have similarly been cooperating with the Museum, again displayed at their city and suburban stations posters announcing Field Museum lecture courses. These posters were also displayed in Marshall Field and Company's retail store and in libraries, schools and other institutions.

The Chicago Rapid Transit Company and associated interurban lines, including the Chicago, North Shore and Milwaukee Railroad, the Chicago, South Shore and South Bend Railroad, and the Chicago, Aurora and Elgin Railroad, distributed 50,000 Field Museum descriptive folders among their patrons. The Chicago, North Shore and

Milwaukee Railroad again allotted space throughout the year to Museum lectures and exhibits in its "This Week's Events Along the North Shore Line" posters which are displayed at all stations between Chicago and Milwaukee.

The Chicago Motor Coach Company, following the extension of its bus service direct to the doors of the Museum, displayed Museum posters in its coaches, printed articles about the Museum in its house organs, and distributed thousands of descriptive folders about the Museum.

Practically all railroads entering Chicago advertised the Museum widely in connection with various excursion trips they conducted. More than 120,000 Field Museum descriptive folders (in addition to the 50,000 distributed by the Rapid Transit and associated companies) were distributed by the Museum and cooperating agencies, including practically every railroad and lake steamship line entering the city, and the principal hotels, clubs, travel bureaus, and department stores. The officers and delegates to many conventions held in Chicago were also furnished with supplies of these folders.

Advertising was given to the Museum also in the house organs for customers and employees published by Marshall Field and Company, Commonwealth Edison Company, People's Gas Light and Coke Company, and many other firms, and in folders and other advertising matter issued by railroads, lake steamship companies, and hotels.

Special cooperative publicity and advertising were arranged between the International Live Stock Exposition and the Museum.

RADIO.—Reports from radio listeners indicate that an increased amount of Field Museum news was broadcast by local radio stations, a number of which are receiving the news releases from the Museum simultaneously with their distribution to the press. Among stations cooperating with the Museum were WGN, the *Chicago Tribune* station; WMAQ, the *Chicago Daily News* station; WLS, *The Prairie Farmer* station; WCFL, the Chicago Federation of Labor station, and many others.

In addition to the broadcasting of news, a special series of six lectures on natural history subjects was broadcast from WLS, the speakers being the Director and other members of the Museum staff.

Many radio stations in Indiana, Illinois, Michigan and Wisconsin cooperated with the Museum in a special campaign at the time of

publication of the book, *Flora of the Indiana Dunes*, which contained material of special interest to the public in those states. Their announcements are believed to have been responsible for many of the sales of copies of this book.

NEWSREELS.—Motion picture newsreel producers evinced considerable interest in Museum activities, and a number of films were taken on various occasions. Among the newsreels which covered Museum events were the *Chicago Daily News*-Universal Newsreel, Kinograms Newsreel, M-G-M International Newsreel and Paramount Newsreel.

EDITORIAL WORK.—The Division of Public Relations performed a large amount of general editorial work on certain publications and other printed matter of the Museum, in addition to that on *Field Museum News*.

DIVISION OF PRINTING

The production of publications, labels and miscellaneous job work in the Division of Printing was, as in the preceding year, exceptionally large and varied.

Special attention was given to supplying promptly the new labels needed by the various Departments, the number printed being 26,645. The recently adopted plan of submitting in case lots the black labels to be replaced has proved quite satisfactory, and has facilitated the installation of the cases.

Of the regular publication series 21,459 copies were issued. As some of the fourteen papers printed were unusually large, they required 2,058 pages of type composition. In addition to the regular publications the leaflets, guides and special publications totaled 1,082 type pages. Worthy of mention also are the twelve issues of *Field Museum News*, the four to six page monthly bulletin inaugurated in January. All of this work, including typesetting, printing and binding, was efficiently done in the Museum.

The composition work on manuscripts long awaiting publication was so nearly completed toward the end of March that the night shift was no longer considered necessary, and was therefore discontinued.

A summary of the publications issued may be found under the caption, Division of Publications, page 311. The other work done in the Division of Printing is as follows:

	Exhibition labels	Other impressions
Anthropology.....	10,474	5,406
Botany.....	2,861	70,245
Geology.....	11,161	2,200
Zoology.....	967	39,050
Harris Extension.....	1,182	3,100
Raymond Foundation.....		175,385
General.....		154,311
Library.....		14,000
Public Relations.....		152,318
Field Museum News.....		82,102
Direction folders for Chicago Rapid Transit Company.....		50,000
Direction folders for Division of Public Relations.....		127,500
Division of Memberships.....		64,757
Post cards.....		105,000
Post card albums.....		225
Total.....	26,645	1,045,599

DIVISION OF ROENTGENOLOGY

The Division of Roentgenology made some important contributions to science during 1930. Repeated experiments with the four prime factors—milliamperage, voltage, distance, and time—necessary for the production of roentgenograms, have resulted in the development of a technique that is unique in the practice of roentgenography. This technique, which produces films of greater brilliancy than it is possible to produce in any other way, is peculiarly adapted to museum work. The ray that this Division applies could not be used on living tissue, however, on account of the caustic effect, but this ray in no way harms the materials that are submitted for examination in the Museum laboratory.

During the past year the manuscript of *Roentgenologic Studies of Egyptian and Peruvian Mummies* by Dr. Roy L. Moodie, of the Wellcome Historical Museum, London, has been edited, revised and arranged for publication.

Although careful pathologic study of the Museum's collection of mummies has just begun, some interesting observations have been made. Arthritis, that disease so prevalent in ancient times, is represented in the Division's files by a collection of outstanding cases. In a dental series it was observed that paradontitis, better known as pyorrhea, was widely distributed among the ancients, and the Museum has a record of impacted lower third molar in a pre-Columbian mummy from Peru.

The discovery of a case of rickets in a little boy from ancient Egypt was corroborated by Dr. G. Elliot-Smith, of University College, London, who visited the Museum late in the year. Dr. Smith said

that, so far as he knows, this is the only case of human rickets that has come out of ancient Egypt. Rickets has been suspected in the study of an ape skeleton from ancient Egypt. It was supposed that the animal was a pet, and that this condition was caused by confinement. Dr. Smith possesses the distinction of having opened and examined more mummy packages than any other individual.

Miss Anna Reginalda Bolan, the Museum's roentgenologist, gave lectures during the past year before the following assemblies: American Society of Radiographers, National Convention, Chicago; Fort Dearborn Camera Club, Chicago; Class of Students in Journalism, Northwestern University; Chicago Society of Radiological Technicians, and American Physical Therapy Association, National Convention, Chicago.

DIVISIONS OF PHOTOGRAPHY AND ILLUSTRATION

PHOTOGRAPHY.—The total number of lantern slides, negatives and prints made by the Division of Photography during 1930 was 32,235. The following tabulation gives a summary of the work performed:

	Lantern slides made	Nega- tives made	Prints made	Enlarge- ments made	Negatives developed for expedi- tions	Trans- parent labels made
Anthropology.....	670	1,297	5,025	29	300	2
Botany.....	267	269	12,264	49	18	...
Geology.....	...	530	899	1	104	6
Zoology.....	544	343	4,391	98	4	75
Harris Extension.....	...	63	122	38	103	...
Raymond Foundation.....	576	22	125	...	...	...
Photogravure.....	...	382	311	...	...	...
Publicity.....	...	24	1,360	...	...	...
General.....	...	85	514	10	...	...
Gift.....	...	...	618	41	...	...
Sales.....	54	...	596	6	...	...
Total.....	2,111	3,015	26,225	272	529	83

PHOTOGRAVURE.—Following is a summary of the photogravures produced during 1930 by this Division:

	Number of prints
Publication illustrations.....	355,100
Leaflet illustrations.....	6,000
Memoirs Series illustrations.....	46,200
Guide covers.....	10,000
Poster headings.....	3,600
Membership headings.....	500
Post cards.....	105,000
Total.....	526,400

ARTIST.—Following is a summary of the work done during 1930 by this Division:

Pen drawings.....	186
Wash drawings.....	41
Lantern slides colored.....	820
Maps drawn and lettered.....	22
Case maps lettered.....	12
Case maps tinted.....	8
Chinese characters drawn.....	13
Field plans drawn and lettered.....	13
Posters drawn.....	2
Case labels color lined.....	15
Photographs retouched.....	51
Photographs tinted.....	6
Negatives blocked.....	98
Negatives tinted.....	4
Negatives lettered for copyright.....	35
Large transparencies tinted.....	1
Transparency maps tinted.....	7
Cuts tooled.....	6
Steel dies engraved.....	2
Miscellaneous items.....	30
Total.....	1,372

DIVISION OF MEMBERSHIPS

The number of names on the membership rolls of the Museum for 1930 shows a slight increase over that registered in 1929. Following is a classified list of the total number of memberships:

Benefactors.....	17
Honorary Members.....	21
Patrons.....	31
Corresponding Members.....	3
Contributors.....	97
Corporate Members.....	50
Life Members.....	356
Non-Resident Life Members.....	7
Associate Members.....	2,296
Non-Resident Associate Members.....	1
Sustaining Members.....	251
Annual Members.....	2,911
Total Memberships.....	6,041

The names of all Members on the rolls as of December 31, 1930, will be found elsewhere in this Report.

CAFETERIA

The cafeteria served refreshments to 101,271 persons during 1930, an increase of 4,766 over the number in 1929. The cafeteria is not operated by the Museum, but is under the management of a concessionaire.

In the pages which follow are submitted the Museum's financial statements, lists of accessions, names of Members, *et cetera*.

STEPHEN C. SIMMS, *Director*.

ATTENDANCE STATISTICS AND DOOR RECEIPTS

FROM JANUARY 1, 1930, TO DECEMBER 31, 1930

Total attendance.....	1,332,799
Paid attendance.....	160,924

Free admissions on pay days:

Students.....	13,221
School children.....	75,744
Teachers.....	1,808
Members.....	1,735

Admissions on free days:

Thursdays (52).....	176,716
Saturdays (52).....	334,823
Sundays (52).....	567,828

Highest attendance on any day (August 17, 1930).....	23,414
Lowest attendance on any day (March 25, 1930).....	6
Highest paid attendance (September 1, 1930).....	6,281
Average daily admissions (365 days).....	3,651
Average paid admissions (209 days).....	770

Number of guides sold.....	11,721
Number of articles checked.....	19,190
Number of picture post cards sold.....	183,235

Sales of publications, leaflets, handbooks, portfolios and photographs.....	\$4,914.72
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TYPE OF CASE LOANED TO THE SCHOOLS OF CHICAGO BY THE N. W. HARRIS PUBLIC SCHOOL
EXTENSION OF FIELD MUSEUM OF NATURAL HISTORY
One-sixth actual size

SUMMARY OF OPERATIONS

FOR THE YEAR ENDED DECEMBER 31, 1930

Endowment Fund income.....	\$194,921.37	
Less: Transferred to Reserve against Security Investments — all funds.....	10,000.00	
		\$184,921.37
Income from funds held under annuity agreements.....	41,001.02	
Life Membership Fund income.....	14,181.74	
Associate Membership Fund income.....	12,592.44	
South Park Commissioners.....	55,911.15	
Annual and Sustaining memberships.....	24,700.00	
Admissions.....	40,220.50	
Sundry receipts.....	14,077.88	
Contributions for general purposes.....	250,000.00	
Contributions for special purposes (expended <i>per contra</i>).....	107,394.99	
Special funds:		
Part expended this year for purposes created (in- cluded <i>per contra</i>).....	40,321.00	
		\$785,322.09
Expenditures:		
Collections.....	\$138,156.90	
Expeditions.....	30,814.47	
Furniture and fixtures, equipment, etc.....	54,572.58	
Plant reproduction.....	15,395.50	
Pensions, group insurance premiums, etc.....	16,371.95	
Research fellowship.....	850.00	
Departmental expenses.....	98,014.89	
General operating expenses.....	496,922.21	
Annuities on contingent gifts.....	38,997.03	
Added to principal of annuity endowments.....	2,003.99	
Interest on loans and tax anticipation warrants....	8,121.28	
		\$900,220.80
Remaining excess of expenditures over income and receipts.....		\$114,898.71

THE N. W. HARRIS PUBLIC SCHOOL EXTENSION

STATEMENT OF INCOME AND EXPENSES FOR THE YEAR 1930

Interest and dividends on investments.....	\$21,405.28
Operating expenses.....	19,889.85
Balance, December 31, 1930.....	\$1,515.43

LIST OF ACCESSIONS

DEPARTMENT OF ANTHROPOLOGY

AMERICAN FRIENDS OF CHINA, Chicago.

- 5 objects: 1 painting on silk representing a cockfight, twelfth century; 1 rhinoceros horn carved with animals, fifteenth century; 1 painted neolithic vase, 1 decorated porcelain jar, 1 gilt bronze figure of rhinoceros—China (gift).

BAHR, A. W., New York.

- 4 objects: 1 decorated jade ring, late Chou period; 1 notched disk, 1 small ox-head of steatite, Han period; 1 plastron of turtle inscribed and used for divination, Shang dynasty, about 1500 B.C.—China (gift).

BOOMER, DR. P. C., Chicago.

- 2 tiles: 1 blue-glazed roofing tile, 1 fragmentary yellow-glazed tile disk—Peiping, China (gift).

BRAUCHER, MRS. ERNEST N., River Forest, Illinois.

- 8 objects: 7 flint arrowheads and spearheads, 1 iron arrowhead—Illinois (gift).

BUHMANN, C. F., Davenport, Iowa.

- 2 short swords in carved bone sheaths—Japan (gift).

BUTLER, BURRIDGE D., Chicago.

- 6 old decorated woolen blankets—Navaho and Hopi, New Mexico (gift).

COTTON, REV. H. A., Warrensburg, Illinois.

- 40 objects: chair, baskets, sandals, clubs, and tools—Ovimbundu, Angola, Africa (gift).

CRANE, R. T., JR., Chicago.

- 5 jade objects: 1 decorated white jade ax, 1 inscribed jade slab from a jade book, 3 archaic jade carvings of deer, dragon, and ox—China (gift).

DOHMEN, U. A., Chicago.

- 2 flint arrowheads—Serrano and Paiute, southern California (gift).

DREYFUS, MOISE, Chicago.

- 1 blanket—Navaho, New Mexico (gift).

DRUMMOND, DR. I. W., New York.

- 1 steatite symbol of Earth—China (gift).

FIELD MUSEUM OF NATURAL HISTORY.

Collected by Field Museum—Oxford University Joint Expedition to Mesopotamia (Marshall Field Fund):

- About 1,200 objects: 47 skulls, skeletal material, 60 complete pots, pottery sherds, clay figurines, flints, shell, bone and metal objects, stone door posts—Kish, Mesopotamia.

Collected by W. D. Hambly, leader of Frederick H. Rawson—Field Museum Ethnological Expedition to West Africa:

- 1,549 ethnological objects—Ovimbundu, Angola; and Yoruba, Nupe, Hausa, Budama, Munshi, Beni—Nigeria.

Collected by Llewelyn Williams, leader of Marshall Field Botanical Expedition to the Amazon (Peruvian Division):

- 15 miscellaneous ethnological objects—Yahuas, Campas, and Kokama, East Andes, Amazon and Ucayali, Peru.

Collected by Dr. Paul S. Martin, leader of Field Museum Archaeological Expedition to the Southwest (Julius and Augusta Rosenwald Fund):

- About 200 objects: pottery, bone, wood, and stone implements—Lowry ruin, Colorado.

Collected by Arthur S. Vernay—Vernay—Lang Kalahari Expedition of Field Museum:

- 28 ethnological objects: bows, quivers with arrows, ostrich eggs, ostrich-eggshell necklaces, head-dresses, belts, apron, string-bag, and a skull—Bushmen, South Africa.

Purchases:

- 5 framed oil paintings representing prehistoric scenes of Europe by Charles R. Knight—Dordogne, France; Neuchatel, Switzerland, from Henry Field.

- 1 cast of bison—Tuc d'Audoubert, Ariège, France, from Count Bégouen.
- 2 stone axes—New South Wales, Australia, from J. W. Woodhead, collector.
- 68 objects: silver jewelry and tools of silversmith, 1 pair of bellows, 30 tools and 1 mold—Navaho, New Mexico, from H. Schweizer, collector (Julius and Augusta Rosenwald Fund).
- 1 model of Maya temple Sub EVII—Uaxactun, Peten, Guatemala.
- About 24 objects: prehistoric mummy of young adult male from burial cave with mat, cord blanket, and 4 pottery sherds, fragmentary child's body and 7 detached parts of bodies—Sierra Madre, Chihuahua, Mexico.
- GREENLEE, WILLIAM B., Chicago.
- 4 objects: 1 ivory opium pipe—China; 1 gilded Buddha image—Siam; 1 knife—Nepal; 1 pottery lamp—Italy (gift).
- GUSINDE, DR. MARTIN, Vienna, Austria.
- 1 plaster cast of the skull of a native of Tierra del Fuego, South America (exchange).
- HASKELL MUSEUM, ORIENTAL INSTITUTE, University of Chicago.
- 14 predynastic pottery jars—Predynastic, Egypt (deposit).
- HEERAMANECK, N. M., New York.
- 6 cast brass figures—Borneo (gift).
- HESS, PROFESSOR J. J., Zürich, Switzerland.
- 1 inscribed metal coin—Arabs, El-Hasa, central Arabia (gift).
- HEUERMANN, MISS MAGDA, Oak Park, Illinois.
- 1 pottery cup from prehistoric tumulus, bronze period—Province of Brandenburg, Prussia (gift).
- HUGHES, THOMAS S., Chicago.
- 2 black-red figure craters—Paestum, Lucania, southern Italy (gift).
- KRIEGER, E. B., Hubbard Woods, Illinois.
- 1 copper spearhead—Hubbard Woods, Illinois (gift).
- LANGDON, PROFESSOR STEPHEN, Oxford, England.
- 1 reproduction of a clay head of a Sumerian—Kish, Irak (gift).
- LEE LING YŪN, Shanghai, in memory of his father, Lee Wan Ching.
- 1 gilt bronze statuette of a standing Buddha, Ming period (1368-1643)—China (gift).
- LINTON, DR. RALPH, Madison, Wisconsin.
- 1 jade arrowhead—Tlingit or Haida, Northwest Coast, North America (exchange).
- MOORE, MRS. WILLIAM H., New York.
- 3 jade objects: 1 green jade brush-holder, 1 yellow jade twin vase, 1 black jade dish, K'ien-lung period (1736-95)—China (gift).
- MOSS, MYER H., Chicago.
- 1 rug—Navaho, New Mexico (gift).
- MUSEUM OF SCIENCE AND INDUSTRIAL ARTS, Chicago.
- 1 model of one of Queen Hatshepsut's boats—Egypt (gift).
- PATTEN, HENRY J., Chicago.
- 6 Babylonian clay tablets—Babylonia, Mesopotamia (gift).
- PEET, FRED N., Chicago.
- 1 decorated birch-bark vessel—junction of Current and Squaw Rivers, Ontario, Canada (gift).
- PITTMAN, MISS LIDA A., Mount Pleasant, Iowa.
- 1 gilded brass bracelet inlaid with cat's-eye—India; 1 shell bead necklace—Prehistoric Indian, Iowa (gift).
- RECORD, PROFESSOR SAMUEL J., New Haven, Connecticut.
- 1 stone ax-head—Santa Marta, Colombia, South America (gift).
- SCHNEIDER, I. S., Chicago.
- 2 iron objects: 1 spear and 1 crescent-shaped ax—North Africa (gift).
- SCHWEPPE, MRS. CHARLES, Chicago.
- 1 decorated metal mirror, T'ang period (A.D. 618-906)—China (gift).

SEED, WILLIAM H., Chicago.

- 1 bone scraper—Waukegan, Illinois (gift).

SKELTON, J. A., Sonsonate, Salvador, Central America.

- 1 stone figure—Chorotega, Nicaragua; 1 carved stone ring—Pre-Columbian, El Salvador, Central America (gift).

SMITH, MRS. GEORGE T., Chicago.

- 1 white jade dish in shape of lotus leaf—China; 1 jade carving of a recumbent lion-like monster devouring two snakes, T'ang period (A.D. 618-906)—China (gift).

VERBOIS, REV. RAFAEL, Baguio, Philippine Islands.

- 1 small clay tablet with image of Vajrapāni—Tibet (gift).

VON DRASEK, FRANK, Cicero, Illinois.

- 17 arrowheads and spearheads of chalcedony, jasper, and flint—Lake Catherine, Magnet Cove, Arkansas; 16 flint arrowheads and

spearheads—Magnet Cove, Arkansas (gift).

WEBER, DAVID, Chicago.

- 2 mortuary clay figures of horsewomen engaged in a polo match, T'ang period (A.D. 618-906)—China (gift).

WEISS, SIDNEY, Chicago.

- 1 alabaster model of Taj Mahal—India (gift).

WHITEHEAD, DR. RALPH M., New York.

- 6 objects: 3 ear ornaments of beetle wings and toucan feathers, 1 cotton bag, 1 bark-cloth shirt, 1 comb—Aguaruna Indians (sub-tribe of Jivaro), Amazon Region, Brazil (gift).

WILLIS, L. M., Chicago.

- 1 glass amphora set in bronze tripod stand—Pompeii, Italy (gift).

YOUNG, J. W., Chicago.

- 2 prehistoric coiled cooking pots—Chaco Canyon, Arizona (gift).

DEPARTMENT OF BOTANY

AELLEN, PROFESSOR P., Basel, Switzerland.

- 102 specimens of plants (exchange).

ARNOLD ARBORETUM, Jamaica Plain, Massachusetts.

- 298 specimens of plants (exchange).

BAILEY, DANA K., New York.

- 4 specimens of plants (gift).

BAILEY, PROFESSOR L. H., Ithaca, New York.

- 5 photographs and specimens of plants from Venezuela (gift).

BEBB, HERBERT, Chicago.

- 2 specimens of plants from Indiana (gift).

BENKE, H. C., Chicago.

- 992 specimens of plants from the United States (gift).

BISHOP MUSEUM, BERNICE P., Honolulu, Hawaii.

- 1 specimen of pia tubers; 2 herbarium specimens (gift).

BLETSCH, W. E., Highland Park, Illinois.

- 34 specimens of North American woods (gift).

BOGUSCH, E. R., Pullman, Washington.

- 78 specimens of plants from western United States (gift).

BOTANICAL GARDEN AND MUSEUM, Berlin-Dahlem, Germany.

- 4,137 specimens of plants, chiefly from South America (exchange).

BRITISH MUSEUM (NATURAL HISTORY), London, England.

- 137 specimens of plants from South America (exchange).

BRUCE, E. L., COMPANY, Memphis, Tennessee.

- 2 red gum boards for exhibition (gift).

CALDERÓN, DR. SALVADOR, San Salvador, Salvador.

- 40 specimens of plants; 2 wood samples (gift).

CALIFORNIA ACADEMY OF SCIENCES, San Francisco, California.

654 specimens of plants (exchange).

CATHOLIC UNIVERSITY OF AMERICA, Washington, D.C.

238 specimens of plants (exchange).

CHAMBERLAIN, PROFESSOR C. J., Chicago.

4 specimens of cycad seeds (gift).

CHANEY, DR. RALPH W., Berkeley, California.

1 specimen of plant from Panama (gift).

CHATEAU, REV. FATHER I., Mission, Texas.

3 specimens of plants; 1 wood specimen (gift).

COOPER, PROFESSOR WILLIAM S., Minneapolis, Minnesota.

1 specimen of plant from Alaska (gift).

CORNELL UNIVERSITY, NEW YORK STATE COLLEGE OF AGRICULTURE, Ithaca, New York.

445 specimens of plants from New York (exchange).

CORY, V. L., Sonora, Texas.

3 specimens of plants (gift).

CURTIN, MRS. LEONORA S., Santa Fe, New Mexico.

144 specimens of plants (gift).

DEAM, C. C., Bluffton, Indiana.

2 specimens of plants (gift).

DEGENER, PROFESSOR OTTO, Honolulu, Hawaii.

14 specimens of plants (gift).

DIRECCIÓN GENERAL DE AGRICULTURA, Guatemala City, Guatemala.

133 specimens of plants (gift).

EYERDAM, WALTER J., Seattle, Washington.

68 specimens of plants from Kamchatka (gift).

FIELD MUSEUM OF NATURAL HISTORY.

Collected by Dr. B. E. Dahlgren (Marshall Field Botanical Expedition to the Amazon, 1929):

304 economic specimens from Brazil.

Collected by Llewelyn Williams (Marshall Field Botanical Expedition to the Amazon, 1929-30, Peruvian Division):

13,000 herbarium specimens; 2,016 wood specimens; 73 economic specimens, from Peru.

Collected by Dr. O. C. Farrington (Marshall Field Brazilian Expedition, 1922-23):

3 economic specimens from Brazil.

Collected by J. Eric Thompson (Second Marshall Field Archaeological Expedition to British Honduras):

30 specimens of plants from British Honduras.

Collected by Dr. A. W. Herre (Cornelius Crane Pacific Expedition of Field Museum):

283 specimens of plants from the Pacific Islands.

Rockefeller Foundation Fund for Photographing Type Specimens: 5,166 negatives of type specimens of the Berlin Herbarium; 32 photographic prints.

Transferred from the Department of Anthropology:

17 economic specimens.

Transferred from the Division of Photography:

5,847 photographic prints.

PURCHASES:

162 specimens of Porto Rican woods, collected by Justo D. Barea.

24 specimens of seeds collected in Trinidad by W. E. Broadway.

100 specimens of Argentine plants collected by Dr. Arturo Donat.

263 specimens of Kamchatka plants collected by Walter J. Eyerdam.

77 specimens of plants collected in Uruguay by Dr. Guillermo Herter.

100 specimens of plants collected in Paraguay by Pedro Jorgensen.

1,460 specimens of Peruvian plants collected by G. Klug.

278 specimens of plants collected in British Honduras by C. L. Lundell.

475 specimens of Venezuelan plants collected by Henri Pittier and W. Gehriger.

224 specimens of Venezuelan plants collected by José Saer d'Héquet.

720 specimens of Peruvian plants collected by Carlos O. Schunke.

- 235 specimens of Brazilian plants collected by E. H. Snethlage.
- 288 specimens of plants from the Dominican Republic, collected by E. J. Valeur.
- 1,686 specimens of Peruvian plants, collected by Dr. August Weberbauer.
- 300 specimens of plants collected in Chile by Dr. K. Behn.
- 100 specimens of plants collected in Argentina by Erik Ammann.
- 510 specimens of Brazilian plants collected by Per Dusén.
- 5 economic specimens.
- FISHER, G. L., Houston, Texas.
193 specimens of plants from Texas (gift).
- FREYNUTH, MRS. W. C., River Forest, Illinois.
1 specimen of a plant (gift).
- GARRETT, PROFESSOR A. O., Salt Lake City, Utah.
158 specimens of plants; 19 packets of seeds (gift).
- GRAHAM, EDWARD H., Pittsburgh, Pennsylvania.
13 specimens of plants from British Guiana and West Indies (gift).
- GRAMS, WILLIAM F. C., Des Plaines, Illinois.
34 specimens of plants (gift).
- GRAY HERBARIUM OF HARVARD UNIVERSITY, Cambridge, Massachusetts.
69 specimens of plants, chiefly from Brazil (exchange).
- GRISCOM, LUDLOW, Cambridge, Massachusetts.
192 specimens of plants from Newfoundland (exchange).
- GRONEMANN, CARL F., Elgin, Illinois.
3 specimens of plants (gift).
- GROSSKURTH, CHARLES, Long Island City, New York.
1 white pine board for exhibit (gift).
- GUTHRIE, JOHN BLAIR, Chicago.
1 specimen of cotton plant (gift).
- HARRIS, MRS. B., Evanston, Illinois.
1 specimen of fungus (gift).
- HAYNIE, MISS NELLIE V., Oak Park, Illinois.
1 specimen of peanut walnuts from Indiana (gift).
- HELLMAYR, DR. C. E., Chicago.
4 specimens of orchids (gift).
- HERCULES POWDER COMPANY, Wilmington, Delaware.
31 samples of wood distillation products; 1 framed picture; 9 photographs (gift).
- HUTCHINSON, MRS. FRANCES, Lake Geneva, Wisconsin.
1 specimen of plant (gift).
- IOWA STATE COLLEGE, Ames, Iowa.
14 samples of corn products (gift).
- IVORY COAST, WEST AFRICA, FOREST SERVICE.
2 wood specimens of African mahogany; 5 herbarium specimens (gift).
- JARDIN BOTANIQUE DE BUITENZORG, Buitenzorg, Java.
8 economic specimens (gift).
- JARDIN BOTANIQUE PRINCIPAL, Leningrad, U.S.S.R.
397 specimens of plants from Colombia and Mexico (exchange).
- JOHANSEN, DR. HOLGER, La Lima, Honduras.
4 specimens of plants (gift).
- JOHNSTON, DR. JOHN R., Boston, Massachusetts.
1 plant specimen (gift).
- KAUFFMANN, EMILIO, Pará, Brazil.
4 specimens of plants (gift).
- KENOYER, PROFESSOR L. A., Kalamazoo, Michigan.
190 specimens of plants (gift).
- KLUG, G., Iquitos, Peru.
32 specimens of plants (gift).
- LANCETILLA EXPERIMENT STATION, Tela, Honduras.
7 photographic prints (gift).
- LANKESTER, C. H., Cartago, Costa Rica.
3 specimens of plants (gift).

- LINDQUIST, RUDOLPH, Winnetka, Illinois.
1 plant specimen (gift).
- LONGLEY, PROFESSOR W. H., Baltimore, Maryland.
1 plant specimen from Florida (gift).
- LUNDELL, C. L., Dallas, Texas.
156 specimens of plants from British Honduras and Texas (gift).
- MCLAUGHLIN BROTHERS AND COMPANY, Chicago.
3 economic specimens (gift).
- MARTÍNEZ, PROFESSOR MAXIMINO, Mexico City, Mexico.
1 photograph of cypress tree (gift).
- MELL, C. D., New York.
91 specimens of plants from Mexico (gift).
- MEXIA, MRS. YNES, Berkeley, California.
1 plant specimen from Mexico (gift).
- MILLAR, JOHN R., Chicago.
2 economic specimens (gift).
- MILLER, T. O., Evanston, Illinois.
1 plant specimen (gift).
- NEWYORKBOTANICALGARDEN, Bronx Park, New York.
4 specimens of plants (exchange).
- OREGON STATE FLAX INDUSTRY, Salem, Oregon.
6 economic specimens (gift).
- ORTIZ, FABIÁN, Guatemala City, Guatemala.
1 plant specimen (gift).
- PENROD, JURDEN AND CLARK COMPANY, Cincinnati, Ohio.
32 veneers of woods (gift).
- PENNSYLVANIA DEPARTMENT OF FORESTS AND WATERS, Harrisburg, Pennsylvania.
2 boards of pitch pine for exhibition (gift).
- PROBST, DR. RUDOLF, Langendorf bei Solothurn, Switzerland.
8 specimens of plants (gift).
- PUBLIC MUSEUM, Milwaukee, Wisconsin.
536 specimens of plants from Wisconsin (exchange).
- PURPUS, DR. C. A., Zacuapam, Mexico.
13 specimens of plants (gift).
- RICHMOND, MISS EMMA, Lodi, Wisconsin.
6 specimens of plants (gift).
- RIGG, PROFESSOR GEORGE B., Seattle, Washington.
3 specimens of plants (gift).
- RIKSMUSEETS BOTANISKA AFDELNING, Stockholm, Sweden.
618 specimens of plants, chiefly from Cuba (exchange).
- ROYAL BOTANIC GARDENS, Kew, England.
22 specimens of plants from South America (exchange).
- RUTH, PROFESSOR ALBERT, Fort Worth, Texas.
24 specimens of plants; 17 packets of seeds (gift).
- SALO, O. J., Red Lodge, Montana.
1 sample of alder wood (gift).
- SCHIPP, WILLIAM A., British Honduras.
311 specimens of plants (gift).
- SCHMIDT, KARL P., Chicago.
16 specimens of plants from New York and Wisconsin (gift).
- SHERFF, DR. EARL E., Chicago.
28 specimens of plants (gift).
- SIMMONS, MRS. E. C., Valdez, Alaska.
3 specimens of plants (gift).
- SLATER, MRS. H. D., El Paso, Texas.
2 specimens of plants from New Mexico (gift).
- SMITH, F. W., Sinaloa, Mexico.
2 packets of seeds (gift).
- STANDLEY, MRS. FLORENCE A., Fort Myers, Florida.
1 plant specimen; 3 packets of seeds (gift).
- STANDLEY, PAUL C., Chicago.
124 specimens of plants from Indiana and Illinois (gift).
- STOKES, W. E., Gainesville, Florida.
1 plant specimen (gift).

UNITED STATES DEPARTMENT
OF AGRICULTURE, BUREAU
OF PLANT INDUSTRY, Wash-
ington, D.C.

1 plant specimen (exchange).

UNITED STATES DEPARTMENT
OF MYCOLOGY AND DIS-
OF AGRICULTURE, OFFICE
EASE SURVEY, Washington,
D.C.

12 specimens of fungi from Central
America (gift).

UNITED STATES NATIONAL MU-
SEUM, Washington, D.C.

4,014 specimens of plants; 144 photo-
graphs of plants (exchange).

UNIVERSITETETS BOTANISKE
MUSEUM, Copenhagen, Den-
mark.

593 specimens of plants from Mexico
and Central America (exchange).

UNIVERSITY OF CALIFORNIA,
DEPARTMENT OF BOTANY,
Berkeley, California.

1,112 specimens of plants (exchange).

UNIVERSITY OF MICHIGAN BO-
TANICAL GARDENS AND
ARBORETUM, Ann Arbor,
Michigan.

116 specimens of plants from Hon-
duras (exchange).

UNIVERSITY OF WISCONSIN, DE-
PARTMENT OF BOTANY,
Madison, Wisconsin.

327 specimens of plants (exchange).

UPHOF, DR. J. C. TH., Winter Park,
Florida.

2 specimens of plants (gift).

VAN CLEEF, PAUL, Chicago.

1 porcelain cup for gathering rubber
latex (gift).

VAN SEVERÉN, DR. ANDRÉS,
Livingston, Guatemala.

1 plant specimen (gift).

WEED, A. C., Chicago.

1 plant specimen (gift).

WITTE MEMORIAL MUSEUM, San
Antonio, Texas.

1 plant specimen (gift).

YALE UNIVERSITY, SCHOOL OF
FORESTRY, New Haven, Con-
necticut.

501 specimens of plants; 2 photo-
graphs; 8 wood specimens (gift).

ZETEK, JAMES, Ancon, Canal Zone.

6 specimens of plants (gift).

DEPARTMENT OF GEOLOGY

ACKERMAN, CHARLES N., Chicago.

1 Pleistocene bird bone—Grass Lake,
Illinois (gift).

AMERICAN MUSEUM OF NATU-
RAL HISTORY, New York.

Cast of pine cone, *Araucarites obscu-
rum* (exchange); section of silici-
fied cone of *Araucarites obscurum*
Wieland. Type—Como Bluff,
Wyoming (exchange).

APPEL, JACK, Chicago.

6 specimens fossil worms—Sag Canal,
Illinois (gift).

BAREMAN, K. S., Chicago.

1 specimen chert concretion—South-
eastern Utah (gift).

BLASCHKE, FREDERICK, Cold
Spring-on-Hudson, New York.

Cave breccia containing imbedded
artifacts of Neanderthal Man—
Le Moustier, France (gift).

BRADY, L. F., Flagstaff, Arizona.

2 specimens Winona meteorite—
Winona, Arizona (exchange).

CHALMERS, WILLIAM J., Chicago.

1 specimen cinnabar—near Phoenix,
Arizona (gift); 4 specimens twin
cerussite crystals—Sierra County,
New Mexico (gift); 6 specimens
crystallized gold—Placer County,
California (gift); 9 specimens
chrysocolla, turquoise and other
minerals—Arizona (gift); 29 spec-
imens crystallized minerals—vari-
ous localities (gift); beryl crystal
weighing 950 pounds—Albany,
Maine (gift).

CHAMPION PORCELAIN COM-
PANY, Detroit, Michigan.

Crystallized andalusite in quartz—
Mocalno, Mono County, Califor-
nia (gift).

CLARK, CHARLES B., Glen Ellyn, Illinois.

- 5 specimens Mexican onyx; 2 specimens calcareous tufa; 3 specimens glauconite—Vernon County, Wisconsin (gift).

COFFMAN, FERN; FOSTER, VERA; LETTL, FRANK H.; LETTL, PAUL C.; and PATTERSON, BRYAN, Chicago.

- 37 specimens fossil plants—Braidwood, Illinois (gift).

CRANE, R. T., JR., Chicago.

- 1 cut tourmaline—Ceylon (gift).

EGGERS, HERMAN C., Germany.

- 5 photographs showing geological features in the Atacama Desert—Chile (gift).

ESPENSHADE, EDWARD, Chicago.

- 6 specimens fossil worms—Sag Canal, Illinois (gift).

FIELD MUSEUM OF NATURAL HISTORY.

Collected by the Braidwood, Illinois, Expedition:

- 126 specimens fossil plants—Braidwood, Illinois.

Collected by the Florissant, Colorado, Expedition:

- 396 specimens fossil plants—Florissant, Colorado.
- 141 specimens fossil insects and spiders—Florissant, Colorado.
- 24 specimens fossil mollusks and ostracods—Florissant, Colorado.
- 1 specimen bird feather—Florissant, Colorado.
- 8 specimens rocks and minerals—Florissant, Colorado.

Collected by the George Bedford Expedition, 1928:

- Skulls and paddle bones of Mosasaur—Russell Springs, Kansas.
- Slab of Miocene rhinoceroses—Agate Springs, Nebraska.
- 5 skulls of Diceratherium—Agate Springs, Nebraska.

Collected by the Marshall Field North Arabian Desert Expedition, 1928:

- 6 specimens sand—North Arabian Desert.
- 151 specimens flint and associated rocks—North Arabian Desert.

Collected by the Marshall Field Paleontological Expedition to Argentina, 1924:

- 1 specimen natrolite—Argentina, South America.

Collected by the Marshall Field Botanical Expedition to the Amazon, 1929-30:

- 4 specimens spheroidal (?) lava—west slope of the Andes, Peru.
- 5 specimens fossil pelecypods—Tarapoto, Province of San Martin, Peru.
- 8 specimens fossil cephalopods—Tarapoto, Province of San Martin, Peru.
- 2 specimens fossil gastropods—Tarapoto, Province of San Martin, Peru.
- 1 specimen fossil starfish—Tarapoto, Province of San Martin, Peru.

Collected by the Sag Canal, Illinois, Expedition:

- 22 specimens fossil worms—Sag Canal, Blue Island, Illinois.
- 3 specimens graptolites—Sag Canal, Blue Island, Illinois.

Collected by the Terre Haute, Indiana, Expedition:

- 35 specimens fossil plants—Terre Haute, Indiana.

Purchases:

- 1 specimen sodalite—Canada.
- 6 specimens rocks—Canada.
- 45 specimens fossil plants and fish—Canada.
- 1 specimen aberrant bivalve—Todos Santos Bay, Baja, California.
- 50 specimens wind-carved pebbles—Southwest Africa.
- 5 specimens wind-carved pebbles—New Zealand.
- 2 specimens banded sandstone—Australia.
- 1 specimen orbicular diabase—Canada.
- 1 specimen lodestone—Wasatch Mountains, Utah.
- Section of iron meteorite—Chihuahua, Mexico.
- Section of iron meteorite—Durango, Mexico.
- 3 slabs of fossil phytosaur teeth—Tucumcari, New Mexico.
- 1 fossil mammoth tooth—Troy, Texas.

- Cast of skull of paleolithic child—
La Gerniere, France.
- Skull of *Protitanotherium*—Ouray,
Utah.
- 1 fossil gastropod preserved in pyrite
—Wright, Iowa.
- 58 specimens trilobites—Clear Lake,
Utah.
- Skeleton of fossil ichthyosaur showing
epidermis—Holzmaden, Germany
(exchange and purchase).
- FIELD, STANLEY, Chicago.
Stone meteorite weighing 745 pounds
—Paragould, Arkansas (gift).
- FULLER, ROBERT, St. Paul,
Minnesota.
1 specimen opalized wood—Pied-
mont, South Dakota (gift).
- GEM SHOP, THE, Wolf Creek,
Montana.
3 moss agates, cut and polished—
Terry, Montana (gift).
- GENERAL INSULATING AND
MANUFACTURING COM-
PANY, Alexandria, Indiana.
2 specimens rock wool; 1 specimen
rock wool cement—Alexandria,
Indiana (gift).
- GRIFFITH, SCOTT, Chicago.
6 specimens fossil worms—Sag Canal,
Illinois (gift).
- HARDINGE, FRANKLIN, Chicago.
1 specimen fossil tree root—Pennsyl-
vania (gift); 1 specimen fossil
coral—Wales (gift).
- HUGHES, FRANK, Ingleside, Illinois.
1 specimen compound siliceous con-
cretion—Colorado (gift).
- JOHNSON, JOHN O., Marseilles,
Illinois.
Limonite concretion in matrix—Mar-
seilles, Illinois (gift).
- JOHNSTON, J. W., Chicago, and
ROACH, H. S., Silver City, New
Mexico.
24 specimens siliceous concretions—
Mogollon Mountains, New
Mexico (gift).
- KEISER, W. G., Quartzite, Arizona.
Series of specimens showing petri-
faction of wood—Quartzite, Ari-
zona (gift).
- KENT, C. A., Evanston, Illinois.
5 specimens colored sands—Mc-
Gregor, Iowa (gift).
- KNUDSON, S. O., Chicago.
1 specimen concretion—Mississippi
(gift).
- LAMON, D. E., Three Lakes, Wis-
consin.
1 crystal of muscovite enclosing
quartz—northern Wisconsin (gift).
- LAUFER, DR. BERTHOLD, Chicago.
1 specimen edible clay—Arizona
(gift).
- LEE, RALPH, Chicago.
1 siderite concretion—near Cincin-
nati, Ohio (gift).
- LETL, PAUL C., Chicago.
11 specimens fossil worms; 6 speci-
mens graptolites—Sag Canal,
Blue Island, Illinois (gift).
- LOREY, ALICE, Chicago.
2 cabochon cut agates; 1 specimen
copper—Keeweenaw County,
Michigan (gift).
- MILLER, A. M., Asheville, Carolina.
1 specimen cyanite—Asheville,
North Carolina (gift).
- MOSS, MYER H., Chicago.
Weathered boulder—near Baldwin,
Michigan (gift).
- McKINLEY, WILLIAM C., Peoria,
Illinois.
2 specimens calcareous tufa—Jack-
son, Minnesota (gift).
- NICHOLSON, VICTOR, Chicago.
5 specimens asphalt—various locali-
ties (gift); 4 specimens sand—
various localities (gift).
- NININGER, H. H., Palmer Lake,
Colorado.
Etched section of Huizopa meteorite
—Huizopa, Chihuahua, Mexico
(exchange).
- NOVAK, THOMAS, Chicago.
1 specimen limonite concretion—
Ellis Lake, Michigan (gift).
- PATTERSON, BRYAN, Chicago.
7 specimens fossil worms—Sag Canal,
Blue Island, Illinois (gift); 1 spec-
imen concretion containing sphal-
erite—Mazon Creek, Illinois
(gift); 1 specimen septaria—
Mazon Creek, Illinois (gift).

PITTS, WILLIAM B., Sunnyvale, California.

- 1 specimen petrified cactus—Adamana, Arizona (gift); 1 specimen stalactitic formation on petrified wood—Adamana, Arizona (gift); 10 specimens polished oolitic and orbicular jasper—Santa Clara County, California (gift); 2 specimens black calcareous oolite—Saratoga Springs, California (gift).

PRICE, G. E., Chicago.

- 1 specimen fossil gum containing egg-shell—East Indies (gift).

RADEFF, DR. I., Dixon, Illinois.

- 1 specimen orthoceras showing siphuncle—Dixon, Illinois (gift).

REID, JOHN T., Lovelock, Nevada.

- 2 specimens thinolite—Lovelock and Granite Point, Pershing County, Nevada (gift).

RIGGS, E. S., Chicago.

- 34 negatives of views in Yellowstone Park (gift).

SALO, O. J., Red Lodge, Montana.

- 2 specimens fossil plants; 3 specimens fossil mollusks; 2 specimens fossil coprolites—Red Lodge, Montana (gift).

SCHURG, HERMAN L., Chicago.

- 4 specimens showing pressure structure in sandstone—Arkansas (gift); 1 specimen chert concretion—Missouri (gift).

SIMMS, STEPHEN C., Chicago.

- 2 photographs of Meteor Crater, Arizona (gift); 1 specimen concretion—Arizona (gift).

SMITH, WALTER H., Galesburg, Illinois.

- 7 specimens fossil mollusks—Galesburg, Illinois; 1 specimen fossil tracks—Grand Canyon, Arizona; 36 specimens fossil plants—Galesburg, Illinois (gift).

STANDARD OIL COMPANY (Indiana), Chicago.

- 13 specimens grease (gift).

SULLIVAN MACHINERY COMPANY, Denver, Colorado.

- 1 granite core 10 feet in length—Colorado (gift).

TELLING, JOHN, ESTATE OF, Chicago.

- 56 specimens native copper and associated minerals—Lake Superior, Michigan (gift).

TRAIN, PERCY, Lower Rochester, Nevada.

- 2 specimens glass colored by sunlight—Arizona (gift).

UNIVERSAL-ATLAS CEMENT COMPANY, Chicago.

- 6 specimens illustrating the manufacture of portland cement—Buffington, Indiana (gift).

VELASCO, M. L., Iquitos, Peru.

- 17 specimens fossil pelecypods; 18 specimens fossil cephalopods; 1 specimen fossil gastropod—Province of Loreto, Peru (gift).

VON DRASEK, FRANK, Cicero, Illinois.

- 33 specimens minerals—Magnet Cove, Arkansas (gift); 2 specimens concretions—Magnet Cove, Arkansas (gift); 1 specimen sand—Magnet Cove, Arkansas (gift); 9 specimens minerals—Murfreesboro, Arkansas (gift); 1 specimen rock—Murfreesboro, Arkansas (gift); 22 cabochon cut amethysts, quartzes, agates and schorlomite—Murfreesboro, Arkansas, and Magnet Cove, Arkansas (gift); group of quartz crystals—Norman, Arkansas (gift).

WALLSCHLAEGER, THEODORE, Chicago.

- 11 specimens fossil worms, Sag Canal, Blue Island, Illinois (gift).

WHALEN, THADDEUS, Spokane, Washington.

- 18 specimens fossil plants—Spokane, Washington (exchange).

WILKING, K. Z., Owensboro, Kentucky.

- 6 specimens petroleum—Kentucky (gift); 4 specimens oil sands—Kentucky (gift).

WILLIAMS, PAULINE L., Chicago.

- 1 sand picture; 1 specimen banded sandstone—McGregor, Iowa (gift).

WRIGHT, WILLIAM M., Burbank, California.

- 1 specimen fossil pelecypod—California (gift).

DEPARTMENT OF ZOOLOGY

AMERICAN MUSEUM OF NATURAL HISTORY, New York.

- 1 lizard—Solomon Islands (exchange); 2 birdskins—South Pacific Ocean (exchange).

AMRINE, MISS ROBERTA, Sycamore, Illinois.

- 1 rough-legged hawk—Sycamore, Illinois (gift).

BAILEY, H. H., Miami, Florida.

- 22 birdskins—North America (exchange).

BARNES, R. MAGOON, Lacon, Illinois.

- 2 moths—Lacon, Illinois (exchange).

BOGERT, CHARLES M., San Diego, California.

- 1 lizard—San Diego County, California (gift).

BRITISH MUSEUM (NATURAL HISTORY), London, England.

- 5 mammal skins and skulls and 3 skeletons—Paraguay (gift).

BULLOCK, DILLMAN S., Angol, Chile.

- 1 pigeon, 25 lizards, 9 frogs—Angol, Chile (gift).

BUNKER, CHARLES, Lawrence, Kansas.

- 1 bog lemming skeleton—Douglas County, Kansas (gift).

BUREAU OF SCIENCE, Manila, Philippine Islands.

- 3 crocodiles—Mindoro, Philippine Islands (gift).

BURGENI, KARMA H. DE, Paris, France.

- 19 shells—San Martinho, Portugal (gift).

BURT, CHARLES E., Waxahachie, Texas.

- 1 lizard, 5 frogs—Nebraska (gift).

CAMERON, DR. WILL J., Chicago.

- 3 lizards—Namib Desert, Africa (gift).

CARLSON, R., Chicago.

- 1 spider—Chicago (gift).

CHEN, DR. K. K., Indianapolis, Indiana.

- 7 green toads—Europe (gift); 6 Chinese toads—China (gift).

CLARK, MISS EMILY A., Chicago.

- 1 lizard—Nigeria (gift).

CLEGG, W. G., Delamere, England.

- 3 red grouse—Yorkshire, England (gift).

COALE, MRS. HENRY K., Chicago.

- 8 mammal skins and 7 skulls—La Puerta Valley, California (gift).

CONANT, ROGER, Toledo, Ohio.

- 11 snakes—Toledo, Ohio (gift); 1 snake—Monroe County, Michigan (gift).

CONOVER, H. B., Chicago.

- 1 red-legged partridge skeleton—Austria (gift).

DAHLGREN, DR. B. E., Chicago.

- 1 jaguarundi skin—Bahia, Brazil (gift).

DOYLE, J. E., Winkelman, Arizona.

- 2 beetles—Winkelman, Arizona, (gift).

DUNKLEBERGER, OTIS, Mishawaka, Indiana.

- 1 silvery lamprey—St. Joseph River, Indiana (gift).

FIELD, HENRY, Chicago.

- 1 Indian python—India (gift); 11 reptiles—Iraq (gift).

FIELD MUSEUM OF NATURAL HISTORY.

Collected by Philip M. Chancellor and Norton Stuart (Chancellor-Stuart-Field Museum Expedition to the South Pacific):

- 3 mammal skins and skulls, 23 birds, 2 boxes plant accessories, 1 box of casts, 1 lot of python eggs, 55 reptiles, 437 fishes, 5 squids, 21 crustaceans—Singapore, Sumatra, Java, etc.

Collected by Dr. Bourret, F. J. De-fosse, Jean Delacour, M. S. Hsuen, Willoughby Lowe, Dr. R. L. Crook, Herbert Stevens (William V. Kelley-Roosevelts Asiatic Expedition):

- 7 mammal skins and skulls, 2,176 birds, 162 reptiles—French Indo-China, Yunnan, Szechwan.
- Collected by W. D. Hambly (Frederick H. Rawson—Field Museum Ethnological Expedition to West Africa):
- 77 reptiles, Angola, Africa.
- Collected by Ashley Hine and John W. Moyer:
- 79 birds, 4 eggs, 1 nest—Momence, Illinois.
- Collected by G. C. Hixon:
- 2 mammals—Illinois.
- Collected by John W. Moyer:
- 7 birds—Illinois.
- Collected by Third Asiatic Expedition of American Museum of Natural History with Field Museum co-operating:
- 153 mammals, 143 skulls—China.
- Collected by Bruce Thorne (Thorne-Graves—Field Museum Arctic Expedition):
- 2 polar bear skulls—Arctic Ocean.
- Collected by Walter A. Weber:
- 2 birds—Illinois.
- Collected by Llewelyn Williams (Marshall Field Botanical Expedition to the Amazon):
- 4 bat skulls, 27 reptiles, 7 invertebrates—Loreto, Peru.
- Purchases:
- 100 small mammal skins and skulls—Abyssinia.
- 2 turtles—Arkansas.
- 3 fruit bats—Australia and Borneo.
- 38 birds—Bolivia.
- 27 mammals, 314 birds, 32 reptiles—Santa Catharina, Brazil.
- 23 birds—British Guiana.
- 3 toads—California.
- 7 rattlesnakes—Connecticut.
- 38 birds—Costa Rica.
- 1 hawk—Egypt.
- 2 reptiles—Florida and California.
- 2 coral snakes—Eureka, Florida.
- 86 birds—Indo-China.
- 151 reptiles—Korea.
- 1 snake—Louisiana.
- 6 mammal skins and skeletons—Madagascar.
- 30 long-horned sculpins—Massachusetts.
- 8 reptiles—Mississippi and Louisiana.
- 15 mammal skins, 5 separate skulls—New South Wales.
- 5,908 birds—North America, South America, Japan, etc.
- 73 birds—North America, Costa Rica.
- 1 Steller's sea-lion—Oregon.
- 834 birds—Queensland, New South Wales, New Guinea, etc.
- 23 reptiles—various localities.
- 102 reptiles—West Australia.
- FINGULIN, JOE A., Chicago.
- 1 sea urchin—Beaufort, North Carolina (gift).
- FRANZEN, A. J., Chicago.
- 1 brown trout, 8 bird lice—Illinois and Wisconsin (gift).
- GENERAL BIOLOGICAL SUPPLY HOUSE, Chicago.
- 2 eels—Florida (gift); 8 reptiles—Brazil (gift); 35 reptiles—various localities (gift); 7 bugs—Idaho (gift).
- GRAVE, B. H., Greencastle, Indiana.
- 5 salamanders—Greencastle, Indiana (gift).
- GREEN, MORRIS M., Ardmore, Pennsylvania.
- 1 lemming mouse—New Jersey (exchange).
- HARRIS, N. W., PUBLIC SCHOOL EXTENSION OF FIELD MUSEUM, Chicago.
- 4 Lapland longspurs—Illinois (gift).
- HAMBLY, W. D., Chicago.
- 23 butterflies—Sierra Leone (gift).
- HOGLE, H. C., Watervliet, Michigan.
- 1 star-nosed mole—Van Buren County, Michigan (gift).
- HULL, CLEMENT, Oak Park, Illinois.
- 11 snakes—River Forest Preserve, Illinois (gift).
- ILLINOIS HUMANE SOCIETY, Chicago.
- 25 western box turtles—Chicago (gift).
- JENKINS, SIDNEY H., Chicago.
- 1 bird—Chicago (gift).

- JOHNSTON, MISS GRACE E., Chicago.
1 weaver bird—Australia (gift).
- KELLEY, JOHN M., Chicago.
5 salamanders—Adams, New York (gift).
- KINSEY, DR. A. C., Bloomington, Indiana.
188 gall insects, 407 insect galls—Europe and North America (gift).
- LAYBOURNE, E. G., Chicago.
1 Blanding's turtle—De Motte, Indiana (gift).
- LEWIS, FRED, Stadra, California.
1 black rhinoceros skin—Tanganyika (gift).
- LILJEBLAD, EMIL, Chicago.
79 beetles—Washington and California (gift).
- LINCOLN PARK AQUARIUM, Chicago.
1 frog—Africa (gift).
- LYON, DR. M. W., South Bend, Indiana.
3 rodents and 1 skull—Indiana (gift);
1 tiger salamander—South Bend, Indiana (gift).
- MARSHALL, BYRON C., Imboden, Arkansas.
15 reptiles—various localities (gift).
- MOONEY, JAMES J., Deerfield, Illinois.
1 mammal skin and skull—Honduras (exchange); 11 reptiles—Illinois (gift).
- MORRISON, REEVES, Chicago.
1 starfish—Florida (gift).
- MOSELEY, PROFESSOR E. L., Bowling Green, Ohio.
1 least weasel—Ohio (gift).
- MOYER, JOHN W., Chicago.
1 Hungarian partridge—Barrington, Illinois (gift).
- MUELLER, ADOLPH, Chicago.
1 night hawk—Chicago (gift).
- MUSEO DE LA PLATA, La Plata, Argentina.
29 snakes—Argentina (exchange).
- MUSEUM OF COMPARATIVE ZOOLOGY, Cambridge, Massachusetts.
5 mammals, 3 birds—Africa and Asia (exchange); 6 bats—Solomon Islands (exchange); 202 mammals—various localities (exchange); 1 deep-sea fish (exchange).
- NEVILLE, RUSSELL T., Kewanee, Illinois.
1 salamander larva, 5 sculpins—Leasburg, Missouri (gift).
- OSINGER, F. D., Chicago.
1 bat—Chicago (gift).
- PALMER, HONORE, and WENTWORTH, JOHN, Chicago.
3 mammal skins with skulls, 6 incomplete skins without skulls, 40 mammal scalps and skulls, 6 mammal scalps without skulls—Kenya Colony and Tanganyika Territory (gift).
- PATTERSON, BRYAN, Chicago.
160 insects—Colorado (gift).
- PERKINS, R. MARLIN, St. Louis, Missouri.
2 snakes—Honduras (gift); 1 snake—Panama (gift).
- PLATH, KARL, Chicago.
1 Mexican black-headed oriole (gift).
- REYNOLDS, ALBERT E., Greencastle, Indiana.
2 salamanders—Indiana (gift).
- ROBERTS, C. E., Evanston, Illinois.
1 abnormal snapping turtle—Charles City, Iowa (gift).
- ROMER, DR. ALFRED S., Chicago.
43 reptiles—Cape Colony, South Africa (gift).
- RUECKERT, ARTHUR G., Chicago.
1 hawk owl—Chicago (gift); 25 ticks—Haywood, Wisconsin (gift).
- RUSSELL, HENRY B., Chicago.
1 spider—Chicago (gift).
- RYDELL, CHARLES, San Francisco, California.
2 gaur oxen, skins, skulls, and leg bones—Indo-China (gift).
- SALGUES, DR. R., Brignoles, Var, France.
2 gall insects, 21 insect galls—Brignoles, France (gift).

- SANBORN, COLIN C., Highwood, Illinois.
1 least weasel skull—Lake County, Illinois (gift).
- SCHMIDT, KARL P., Homewood, Illinois.
3 mammal skins and skulls—California (exchange); 30 reptiles—Idaho (gift); 5 beetles—Miller, Indiana (gift).
- SPENCER, DON A., Chicago.
1 beaver skull—Porter County, Indiana (gift).
- SHEDD, JOHN G., AQUARIUM, Chicago.
1 green turtle, 19 fishes—Key West, Florida (gift); 1 black drum fish—New Jersey (gift); 27 fishes—various localities (gift).
- SINGH, DILIPAT, Singahi, Oudh, India.
1 Indian sloth bear skin, skull, and skeleton—Kheri District, India (gift).
- STRECKER, PROFESSOR J. K., Waco, Texas.
224 shells—southern United States (gift).
- TAYLOR, EDWARD H., Lawrence, Kansas.
19 reptiles and batrachians—Lawrence, Kansas (gift).
- TUTHILL, MRS. BEULAH LOGAN, Lakeside, Michigan.
1 fruit pigeon—Caroline Islands (gift).
- UNITED STATES BUREAU OF FISHERIES, Washington, D.C.
1 American sole—Beaufort, North Carolina (gift).
- UNIVERSITY OF IOWA, Iowa City, Iowa.
1 Steller's sea-lion—La Push, Washington (exchange).
- UNIVERSITY OF OKLAHOMA, Norman, Oklahoma.
8 turtles—Oklahoma (gift).
- VAN CLEAVE, DR. H. J., Urbana, Illinois.
1 turtle—Tennessee (gift).
- WEBER, MISS CAROLYNE, Chicago.
1 Indigo bunting—Chicago (gift).
- WEBER, WALTER A., Evanston, Illinois.
1 meadow lark—Evanston (gift); 10 bird-lice—Morton Grove, Illinois (gift).
- WEIL, MAURICE, Chicago.
1 glass snake—Sand Dunes, Indiana (gift).
- WELD, DR. LEWIS H., East Falls Church, Virginia.
15 gall insects, 16 insect galls—Arizona (gift).
- WESTCOTT, CHARLES, Springfield, Massachusetts.
1 bat, 3 newts—Massachusetts (gift).
- WILLIAMSON, E. B., Bluffton, Indiana.
3 damselflies—Colombia (gift).
- WOEFFS, HAROLD B., Chicago.
1 Cooper's hawk—Chicago (gift).
- WONDER, FRANK C., Chicago.
22 ticks—Tanganyika Territory (gift).
- ZIMMER, JOHN T., New York.
2 Gray's bats—British New Guinea (gift).

RAYMOND FOUNDATION

FIELD MUSEUM OF NATURAL HISTORY.

From Division of Photography: 576 slides for extension lectures; 22 negatives for extension lectures; 125 prints for files.

UNITED FRUIT COMPANY, Boston, Massachusetts.

16 slides for the lecture "A Trip to Banana Land," and 26 copies of

the revised version of the lecture (gift).

COMPTON AND COMPANY, Chicago.

1 set (10 volumes) of Compton's Pictured Encyclopedia (gift).

PARAMOUNT NEWS FILMS, Chicago.

1 motion picture reel "Washing the Elephants" (gift).

SPOOR AND ABHE FILM CORPORATION, Chicago.

2 motion picture reels, "Enamelware"; 3 reels, "Trees to Tribunes" (gift).

CAPTAIN HAROLD A. WHITE, New York.

1 motion picture reel, "Lions on the Rocks" (gift).

UNITED STATES STEEL CORPORATION, New York.

Partial motion picture reel on "Cement" (gift).

DIVISION OF PHOTOGRAPHY

BEYER, PROFESSOR O. H., Manila, Philippine Islands.

95 photographs of pottery from burial caves of the Philippines (gift).

FIELD MUSEUM OF NATURAL HISTORY.

Made by Division of Photography: 26,225 prints, 3,015 negatives, 2,111 lantern slides, 272 enlargements, and 83 transparent labels.

Developed for expeditions: 529 negatives.

Made by C. Suydam Cutting: 4,000 feet of motion picture film taken in western China.

Made by B. E. Dahlgren: 56 negatives of landscapes and general views in northern Brazil.

Made by W. D. Hambly: 230 negatives of natives, landscapes and general views in West Africa.

Made by Paul S. Martin: 59 negatives of landscapes and general views in the southwestern part of Colorado.

Made by Elmer S. Riggs: 8 negatives of skeleton in process of mounting; 58 negatives of general views in the Grand Canyon, Yellowstone Park, and Los Angeles, California.

LIBRARY

LIST OF DONORS AND EXCHANGES

(Accessions are by exchange, unless otherwise designated)

FOREIGN INSTITUTIONS

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Durban Museum, Durban.
East Africa and Uganda Natural History Society, Pretoria.
Geological Society, Johannesburg.
Institut d'Égypte, Cairo.
Rhodesia Museum, Bulawayo.
Royal Society of South Africa, Cape Town.
Salamambo-Station Océanographique, Tunis.
Scientific Association of Rhodesia, Bulawayo.
Société d'Histoire Naturelle de l'Afrique du Nord, Algiers.
Société de Géographie d'Alger, Algiers.
Société des Sciences Naturelles du Maroc, Rabat.
South African Association for the Advancement of Science, Cape Town.
South African Museum, Cape Town.
Transvaal Museum, Pretoria.
University of Stellenbosch, Stellenbosch.

ARGENTINA:

Ministerio de Agricultura, Buenos Aires.
Museo de La Plata, La Plata.
Sociedad Argentina de Ciencias Naturales, Buenos Aires.
Sociedad Ornitológica del Plata, Buenos Aires.
Sociedad Physis, Buenos Aires.
Universidad Nacional, Buenos Aires.
Universidad Nacional de Tucumán, Tucumán.

AUSTRALIA:

Australian Museum, Sydney.
Botanic Gardens and Government Domains, Sydney.
Commonwealth of Australia, Melbourne.
Council for Scientific and Industrial Research, Melbourne.
Department of Agriculture, Adelaide.
Department of Agriculture, Brisbane.
Department of Agriculture, Sydney.
Department of Agriculture, Wellington.

Department of Agriculture of Western Australia, Perth.
 Department of Fisheries, Sydney.
 Department of Mines, Brisbane.
 Department of Mines, Sydney.
 Field Naturalists' Club, Melbourne.
 Forestry Commission, Sydney (gift).
 Geological Survey of Western Australia, Perth.
 Linnean Society of New South Wales, Sydney.
 Melbourne University, Melbourne.
 Ornithological Society of South Australia, Adelaide.
 Public Library, Museum and Art Gallery, Adelaide.
 Public Library, Museum and Art Gallery of Victoria, Melbourne.
 Queensland Museum, Brisbane.
 Royal Geographical Society of Australasia, Brisbane.
 Royal Society of Queensland, Brisbane.
 Royal Society of South Australia, Adelaide.
 Royal Society of Tasmania, Hobart.
 Royal Society of Victoria, Melbourne.
 Royal Zoological Society of New South Wales, Sydney.
 Technological Museum, Sydney.

AUSTRIA:

Akademie der Wissenschaften, Vienna.
 Anthropos Administration, Vienna.
 Naturhistorisches Museum, Vienna.
 Naturwissenschaftlicher Verein, Graz.
 Universität, Vienna.
 Zoologisches Institut, Graz.

BELGIUM:

Académie Royale de Belgique, Brussels.
 Académie Royale des Sciences, Brussels.
 Bulletin Agricole du Congo, Brussels.
 Institut Botanique Léo Errera, Brussels.
 Jardin Botanique de l'Etat, Brussels.
 Musée du Congo Belge, Tervueren.
 Musée Royal d'Histoire de Belgique, Brussels.
 Musées Royaux du Cinquantenaire, Brussels.
 Nederlandsch Phytopathologische (Plantenziekten) Vereenigen, Ghent.
 Société Belge de Géologie, Brussels.
 Société de Botanique, Brussels.

Société Ornithologique de la Belgique, Brussels.
 Université de Louvain.

BRAZIL:

Academia Brasileira das Ciencias, Rio de Janeiro.
 Biblioteca Nacional, Rio de Janeiro.
 Instituto Archeologico Geographico, Pernambuco.
 Instituto de Butantun, Sao Paulo.
 Instituto Oswaldo Cruz, Rio de Janeiro.
 Jardin Botânico, Rio de Janeiro.
 Ministerio de Agricultura, Rio de Janeiro.
 Museo Nacional, Rio de Janeiro.
 Secretaria de Agricultura, Comercio e Obras Publicas, Sao Paulo.
 Serviço Geologico e Mineralogico, Rio de Janeiro.

BRITISH GUIANA:

Board of Agriculture, Georgetown.

BRITISH WEST INDIES:

Department of Agriculture, Bridgetown, Barbados.
 Department of Agriculture, Jamaica, Kingston.
 Trinidad and Tobago Department of Agriculture, Port of Spain, Trinidad.
 Tropical Agriculture, Trinidad.

CANADA:

Art, Historical and Scientific Association, Vancouver, British Columbia.
 Canadian Mining Journal, Garden-ville, Quebec.
 Department of Agriculture of Nova Scotia, Halifax.
 Department of Agriculture, Ottawa, Ontario.
 Department of Agriculture, Victoria, British Columbia.
 Department of Mines, Ottawa, Ontario.
 Department of Mines, Toronto, Ontario.
 Entomological Society of Ontario, Toronto, Ontario.
 Geological Survey, Ottawa, Ontario.
 National Museum, Ottawa, Ontario.
 Naturaliste Canadien, Quebec, Quebec.
 Nova Scotian Institute of Natural Sciences, New Brunswick, Nova Scotia.
 Provincial Museum, Toronto, Ontario.

Provincial Museum, Victoria, British Columbia.
 Royal Canadian Institute, Toronto, Ontario.
 Royal Society of Canada, Ottawa, Ontario.
 Société de Géographie, Quebec, Quebec.
 Université de Montreal, Montreal, Quebec.
 University of Toronto, Toronto, Ontario.

CEYLON:

Colombo Museum, Colombo.
 Department of Agriculture, Colombo.

CHILE:

Biblioteca Nacional, Santiago.
 Museo Nacional, Santiago.
 Revista Chilena de Historia y Geografía, Santiago.

CHINA:

Botanical and Forestry Department, Hong Kong.
 China National Research Institute, Shanghai.
 Geological Society, Peiping.
 Geological Survey, Peiping.
 Hong Kong Naturalist, Hong Kong.
 Kwangtung and Kwangsi Geological Survey, Canton.
 Metropolitan Library, Peiping.
 Royal Asiatic Society of North China, Shanghai.
 Science Society of China, Shanghai.
 University of Nanking, Nanking.
 Yenching University, Peiping.

COLOMBIA:

Ministerio de Industrias, Bogotá.
 Sociedad Colombiana de Ciencias Naturales, Bogotá.

CUBA:

Academia Nacional de Artes y Letras, Havana.
 Asociación de Dependientes del Comercio de la Habana, Havana.

CZECHOSLOVAKIA:

Académie Tchèque des Sciences, Prague.
 Deutscher Naturwissenschaftlich-Medizinischer Verein für Böhmen "Lotos," Prague.
 Narodniho Musea, Prague.
 Societas Entomologicae Cechoslovinae, Prague.

DENMARK:

Botaniske Have, Copenhagen.
 Dansk Botanisk Forening, Copenhagen.
 Danske Geografiske Selskab, Copenhagen.
 Dansk Geologisk Forening, Copenhagen.
 Dansk Naturhistorisk Forening, Copenhagen.
 Dansk Ornithologisk Forening, Copenhagen.
 Kommissionen for Ledelsen af de Geologiske og Geografiske Undersøgelser i Grønland, Copenhagen.
 Nationalmuseet, Copenhagen.
 Université, Copenhagen.

EAST INDIES:

Sarawak Museum, Sarawak, Borneo.

ECUADOR:

Academia Nacional de Historia, Quito.

FEDERATED MALAY STATES:

Federated Malay States Museums, Kuala Lumpur.
 Malayan Agricultural Society, Kuala Lumpur.
 Raffles Museum and Library, Singapore.
 Royal Asiatic Society, Malayan Branch, Singapore.

FIJI ISLANDS:

Department of Agriculture, Suva.

FINLAND:

Finska Minnesforening, Helsingfors.
 Suomen Museo, Helsingfors.

FRANCE:

Académie des Sciences, Paris.
 Ecole d'Anthropologie, Paris.
 Institut de Zoologie de l'Université, Montpellier.
 Musée Guimet, Paris.
 Muséum d'Histoire Naturelle, Marseilles.
 Muséum d'Histoire Naturelle, Rouen.
 Muséum National d'Histoire Naturelle, Paris.
 Nature, Paris.
 Société d'Histoire Naturelle d'Ardenne, Ardenne.
 Société d'Histoire Naturelle, Toulouse.
 Société de Géographie, Paris.
 Société des Américanistes, Paris.

Société des Etudes des Sciences Naturelles, Rheims.
 Société des Etudes Scientifiques, Angers.
 Société des Sciences Naturelles, La Rochelle.
 Société Linéenne, Bordeaux.
 Société Nationale d'Acclimatation de France, Paris.
 Société Nationale d'Horticulture de France, Paris.
 Société Scientifique du Bourbonnais et du Centre de France, Moulins.
 Université-Faculté des Sciences, Marseilles.

GERMANY:

Akademie der Wissenschaften, Berlin.
 Akademie der Wissenschaften, Heidelberg.
 Akademie der Wissenschaften, Leipzig.
 Bayerische Akademie der Wissenschaften, Munich.
 Bayerische Botanische Gesellschaft, Munich.
 Botanischer Garten und Botanisches Museum, Berlin.
 Botanischer Verein der Provinz Brandenburg, Berlin.
 Deutsche Entomologische Gesellschaft, Berlin.
 Deutsche Geologische Gesellschaft, Berlin.
 Deutsche Gesellschaft für Anthropologie, Ethnologie und Urgeschichte, Berlin.
 Deutsche Morgenländische Gesellschaft, Leipzig.
 Deutscher Seefischerei Verein, Berlin.
 Geographische Gesellschaft, Hamburg.
 Geographische Gesellschaft, Hannover.
 Geographische Gesellschaft, Munich.
 Georg-August-Universität, Göttingen.
 Gesellschaft für Erdkunde, Berlin.
 Gesellschaft Naturforschende Freunde, Berlin.
 Gesellschaft zur Beförderung Gesamten Naturwissenschaften, Marburg.
 Hamburgische Universität, Hamburg.
 Hessische Ludwigs-Universität, Giessen.
 Mineralogisch-Geologisches Museum, Dresden.
 Museum für Natur- und Heimatkunde, Magdeburg.
 Museum für Tierkunde und Völkerkunde, Dresden.

Museum für Völkerkunde, Berlin.
 Museum für Völkerkunde, Hamburg.
 Nassauischer Verein für Naturkunde, Wiesbaden.
 Naturforschende Gesellschaft, Freiburg.
 Naturforschende Gesellschaft, Görtz.
 Naturhistorische Gesellschaft, Nürnberg.
 Naturhistorischer Verein, Colmar.
 Naturhistorischer Verein der Preussischen Rheinlande und Westfalens, Bonn.
 Naturwissenschaftliche Gesellschaft, "Isis," Dresden.
 Naturwissenschaftlicher Verein, Augsburg.
 Naturwissenschaftlicher Verein, Bremen.
 Naturwissenschaftlicher Verein, Schleswig-Holstein, Kiel.
 Ornithologische Gesellschaft in Bayern, Munich.
 Preussische Staatsbibliothek, Berlin.
 Schlesische Gesellschaft für Vaterland, Breslau.
 Senckenbergische Naturforschende Gesellschaft, Frankfurt on the Main.
 Société Géologique du Nord, Darmstadt.
 Städtisches Völker Museum, Frankfurt on the Main.
 Thüringischer Botanischer Verein, Weimar.
 Universitäts Bibliothek, Heidelberg.
 Universitäts Bibliothek, Munich.
 Universitäts Bibliothek, Tübingen.
 Verein für Vaterländische Naturkunde, Württemberg.
 Verein für Volkskunde, Berlin.
 Zoologisches Museum, Berlin.
 Zoologisches Museum, Hamburg.

GREAT BRITAIN:

Ashmolean Museum, Oxford.
 Ashmolean Natural History Society, Oxford.
 Birmingham Natural History and Philosophical Society, Birmingham.
 Brighton and Hove Natural History and Philosophical Society, Brighton.
 Bristol Museum, Bristol.
 British Library of Political Science, London.
 British Museum, London.
 British Museum (Natural History), London.
 Cambridge Philosophical Society, Cambridge.

Cambridge University, Cambridge.
Croydon Natural History and Scientific Society, Croydon.

Dove Marine Laboratory, Cullercoats.

Dumfriesshire and Galloway Natural History Society, Dumfries.

Fisheries Board, Edinburgh.

Geological Survey of England and Wales, London.

Geological Survey of Scotland, Edinburgh.

Geologists' Association, London.

Hull Museum, Hull.

Imperial College of Science and Technology, London.

Japan Society of London, London.

Lancashire Sea Fisheries Laboratory, Liverpool.

Leicester Museum, Art Gallery and Library, Leicester.

Linnean Society, London.

Liverpool Biological Society, Liverpool.

Manchester Literary and Philosophical Society, Manchester.

Manchester Museum, Manchester.

Marine Biological Association, Plymouth.

Museum and Art Gallery, Sheffield.

National Indian Association, London.

National Library, Cardiff.

National Museum of Wales, Cardiff.

Natural History Society of Northumberland, Durham and Newcastle-on-Tyne, Newcastle-upon-Tyne.

Naturalists' Field Club, Belfast.

Naturalists' Society, Cardiff.

Royal Anthropological Institute of Great Britain and Ireland, London.

Royal Asiatic Society of Great Britain and Ireland, London.

Royal Botanic Garden, Edinburgh.

Royal Botanic Gardens, Kew.

Royal Colonial Institute, London.

Royal Geographical Society, London.

Royal Horticultural Society, London.

Royal Scottish Museum, Edinburgh.

Royal Society, London.

Royal Society of Arts, London.

Royal Society of Edinburgh, Edinburgh.

School of Oriental Studies, London.

South London Entomological and Natural History Society, London.

Southeastern Agricultural College, Wye.

Tring Zoological Museum, Tring.

Victoria and Albert Museum, London.

Wellcome Research Laboratories, London.

Zoological Society, London.

GUATEMALA:

Sociedad de Geografía é Historia, Guatemala City.

HUNGARY:

Musée National e Hongrois, Budapest.

INDIA:

Anthropological Society, Bombay.

Archaeological Survey, Calcutta.

Asiatic Society of Bengal, Calcutta.

Bihar and Orissa Research Society, Patna.

Department of Agriculture, Bombay.

Department of Agriculture, Madras.

Geological, Mining and Metallurgical Society of India, Calcutta.

Geological Survey, Calcutta.

Government of India, Calcutta.

Government Museum, Madras.

Indian Botanical Society, Calcutta.

Indian Museum, Calcutta.

Mining and Geological Institute of India, Calcutta.

Prince of Wales Museum of West India, Bombay.

Royal Asiatic Society, Ceylon Branch, Colombo.

Ryoun College of Engineering, Ryoun.

University of Calcutta, Calcutta.

Zoological Survey of India, Calcutta.

IRELAND:

National Museum, Dublin.

Royal Irish Academy, Dublin.

Royal Society, Dublin.

University of Dublin, Dublin.

ITALY:

Istituto di Botanico, Pavia.

Istituto Superiore Agrario, Portici.

R. Accademia d'Italia, Rome.

R. Accademia delle Scienze, Turin.

R. Accademia Nazionale del Lincei, Rome.

R. Società Geografica Italiana, Rome.

R. Ufficio Geologico d'Italia, Rome.

Società dei Naturalisti, Naples.

Società Reale dei Napoli, Naples.

JAPAN:

Anthropological Society of Tokyo, Tokyo.

Department of Agriculture of Formosa.

Imperial Academy of Tokyo, Tokyo.

Imperial Geological Survey, Tokyo.
Imperial Household Museums,
Tokyo.

Imperial University, Tokyo.

Imperial University, College of Agriculture, Kyoto.

Imperial University, College of Sciences, Kyoto.

Miyazaki College of Agriculture and Forestry, Miyazaki.

National Research Council, Tokyo.

Ornithological Society, Tokyo.

Tohoku Imperial University, Sendai.

Tokyo Botanical Society, Tokyo.

Tokyo-Koko-Gakkwai, Tokyo.

Tottori Agricultural College, Tottori.

JAVA:

Anthropological Laboratory of Java,
Bandoeng.

Bataviaasch Genootschap van Kun-
sten en Wetenschappen, Batavia.

Department of Agriculture, Buiten-
zorg.

Encyclopaedisch Bureau, Weltevreden.

Instituut, Weltevreden.

Jardin Botanique, Weltevreden.

K. Natuurkundige Vereeniging in
Nederlandsch-Indie, Weltevreden.

MEXICO:

Dirección General de Estadística,
Mexico City.

Instituto de Biología, Mexico City.

Instituto de Biológico, Mexico City.

Instituto Geológico de Mexico, Mex-
ico City.

Museo Nacional de Arqueología,
Historia y Etnología, Mexico City.

Secretaría de Agricultura y Fomento,
Mexico City.

Secretaría de Educación Pública,
Mexico City.

Secretaría de Educación Pública.
Dirección de Arqueología, Mexico
City.

Sociedad Científica "Antonio
Alzate," Mexico City.

Sociedad de Geografía y Estadista,
Mexico City.

Sociedad Forestal de Mexico, Mexico
City.

Sociedad Mexicana Geográfica y
Estadística, Mexico City.

NETHERLANDS:

Hollandsche Maatschappij der Wet-
enschappen, Haarlem.

Koloniaal Instituut, Amsterdam.

K. Akademie van Wetenschappen,
Amsterdam.

K. Instituut voor de Taal-Land-en
Volkenkunde van Nederlandsch
Indie, The Hague.

K. Nederlandsch Aardrijkundig Ge-
nootschap, Amsterdam.

Landbouwhoogerschool, Wagen-
ingen.

Leiden Museum, Leiden.

Museum voor Land-en Volkenkunde
en Maritiem Museum "Prinz Hen-
drik," Rotterdam.

Nederlandsche Dierkunde Vereenig-
ing, Helder.

Nederlandsch Vogelkundigen Club,
Leiden.

Rijks Ethnographisch Museum, Lei-
den.

Rijks Geologisch-Mineralogisches
Museum, Leiden.

Rijks Herbarium, Leiden.

Rijks Museum van Natuurlijke His-
torie, Leiden.

Rijks Universiteit, Groningen.

Rijks Universiteit, Leiden.

NEW ZEALAND:

Auckland Institute and Museum,
Wellington.

Canterbury College, Christchurch.

Canterbury Museum, Christchurch.

Cawthorn Institute, Nelson.

Department of Agriculture, Welling-
ton.

Department of Mines, Geological
Survey, Wellington.

Department of Scientific and Indus-
trial Research, Wellington.

Dominion Museum, Wellington.

New Zealand Institute, Wellington.

NORWAY:

Bergen Museum, Bergen.

Norges Geologiske Undersøkelse,
Oslo.

Norges Svalbad og Ishav Under-
søkelse, Oslo.

Norsk Geologisk Forening, Oslo.

Norske Videnskapsakademi, Oslo.

Nyt Magazin for Naturvidenska-
berne, Oslo.

Zoologiske Museum, Oslo.

PANAMA:

Gorgas Memorial Institute for Trop-
ical Medicine, Panama City.

PERU:

Universidad, Cuzco.

POLAND:

Académie Polonaise des Sciences et
des Arts, Cracow.

Musei Polonici Historiae Naturali,
Warsaw.
Musei Zoologici Polonici, Warsaw.
Polska Akademia Umiejetnosci, Cra-
cow.
Société Botanique de Pologne, War-
saw.

PORTO RICO:

Agricultural Experiment Station,
Porto Rico, Rio Piedras.

PORTUGAL:

Sociedade Portuguesa de Sciencias
Naturais, Lisbon.
Universidade de Coimbra, Museu
Zoologico, Coimbra.
Universidade de Lisboa, Lisbon.

ROUMANIA:

Université de Jassy, Jassy.

SPAIN:

Institució Catalana d'Historia Na-
tural, Barcelona.
Junta para Ampliación de Estudios
e Investigaciones Cientificas,
Madrid.
Musei de Ciencias Naturales, Ma-
drid.
R. Accademia de Ciencias, Madrid.
Sociedad Espanola de Antropologia,
Etnografia y Prehistoria, Madrid.
Sociedad Espanola de Historia Na-
tural, Madrid.

SWEDEN:

Generalslaben Litografiska Anstalt,
Stockholm.
Geologiska Institutet, Stockholm.
Göteborgs Botanika Trädgrad, Göte-
borg.
Göteborgs Museum, Göteborg.
K. Svenska Vetenskapsakademien,
Stockholm.
K. Vetenskaps och Vitterhets Sam-
hälle, Göteborg.
K. Vitterhets, Historie och Antik-
vitets Akademien, Stockholm.
Lunds Universitet, Lund.
Osasiatiska Samlingarna, Stockholm.

SWITZERLAND:

Botanisches Museum, Zürich.
Geographisch-Ethnographische Ge-
sellschaft, Zürich.
Musei Zoologie e Anatomie, Geneva.
Museo Civico di Storia Naturale,
Geneva.
Naturforschende Gesellschaft, Basel.
Naturforschende Gesellschaft, Bern.
Naturforschende Gesellschaft, Zü-
rich.
Naturhistorisches Museum, Basel.
Schweizerische Entomologische Ge-
sellschaft, Bern.
Schweizerische Gesellschaft für
Volkskunde, Basel.
Société Botanique, Geneva.
Société de Physique et d'Histoire
Naturelle, Geneva.
Société Helvétique des Sciences Na-
turelles, Aarau.
Société Neuchateloise de Géographie,
Neuchatel.
Société Zoologique, Geneva.
Stadtbibliothek, Bern.
Universität, Bern.

UNION OF SOCIALISTIC SOVIET REPUBLICS:

Abhasian Scientific Society, Suchum.
Académie des Sciences, Leningrad.
Musée Géologique de Minéralogie
Pierre le Grand, Leningrad.
Revue Zoologique Russe, Leningrad.
Russian Zoological Journal, Moscow.
Société des Naturalistes, Leningrad.
Société des Naturalistes, Voronej.
Société Ouralienne d'Amis des
Sciences Naturelles, Ekaterinberg.
Université de l'Asie Centrale, Tash-
kent.
Université Tartu, Tartu.
Wissenschaftliche Muresinstitut,
Moscow.
Zoological Museum, Moscow.

URUGUAY:

Instituto de Geologia y Perforaciones,
Montevideo.
Museo de Historia Natural, Monte-
video.

VENEZUELA:

Cultura Venezolana, Caracas.

DOMESTIC INSTITUTIONS

ALABAMA:

Geological Survey, University.

ARIZONA:

Arizona Museum, Phoenix.
Arizona State Museum, University
Station, Tucson.

ARKANSAS:

Arkansas Geological Survey, Little
Rock (gift).

CALIFORNIA:

Agricultural Experiment Station,
Berkeley.

Balboa Park Museum, San Diego.
 California Academy of Sciences, San Francisco.
 Cooper Ornithological Club, Hollywood.
 County Free Library, Los Angeles (gift).
 Department of Agriculture, Sacramento.
 Fish and Game Commission, Sacramento.
 Los Angeles Museum, Los Angeles.
 Natural History Museum, San Diego.
 Pomona College, Claremont.
 Santa Barbara Museum, Santa Barbara.
 Scripps Institution of Biological Research, La Jolla.
 Society of Natural History, San Diego.
 Southern California Academy of Sciences, Los Angeles.
 Southwest Museum, Los Angeles.
 Stanford University, Palo Alto.
 State Mining Bureau, Sacramento.
 Tuna Club, Avalon (gift).
 University of California, Berkeley.
 University of Southern California, Los Angeles.
 Zoological Society, San Diego.

COLORADO:

Agricultural Experiment Station, Fort Collins.
 Bureau of Mines, Denver.
 Colorado College, Colorado Springs.
 Colorado Scientific Society, Denver.
 Denver Art Museum, Denver (gift).
 Museum of Natural History, Denver.
 State Historical and Natural History Society, Denver.

CONNECTICUT:

Agricultural Experiment Station, New Haven.
 Connecticut Academy of Arts and Sciences, New Haven.
 Hartford Public Library, Hartford.
 Osborn Botanical Laboratory, New Haven.
 State Geological and Natural History Survey, Hartford.
 Yale University, New Haven.

FLORIDA:

Agricultural Experiment Station, Gainesville (gift).
 Bailey Museum and Library of Natural History, Miami (gift).
 State Geological Survey, Tallahassee.
 University of Florida, Gainesville (gift).

HAWAII:

Agricultural Experiment Station, Honolulu.
 Bernice Pauahi Bishop Museum, Honolulu.
 Hawaiian Entomological Society, Honolulu (gift).
 Hawaiian Historical Society, Honolulu.
 Hawaiian Volcano Observatory, Honolulu.
 University of Hawaii, Honolulu.

ILLINOIS:

Agricultural Experiment Station, Urbana.
 Art Institute of Chicago.
 Avicultural Society of America, Chicago.
 Board of Education, Chicago.
 Chicago Academy of Sciences, Chicago.
 Chicago Historical Society, Chicago (gift).
 Chicago Public Library, Chicago.
 Division of Natural History Survey, Urbana.
 Forestry Service, Urbana.
 Geographic Society, Chicago.
 Hardwood Record, Chicago.
 Humanitas Publishing Company, Chicago (gift).
 Inland Printer, Chicago (gift).
 Izaak Walton League of America, Chicago (gift).
 John Crerar Library, Chicago.
 Morton Arboretum, Lisle.
 Museum of Science and Industry, Chicago.
 Newberry Library, Chicago.
 Oologist, Lacon (gift).
 Open Court Publishing Company, Chicago.
 State Board of Agriculture, Springfield.
 State Geological Survey, Springfield.
 State Historical Library, Springfield.
 State Water Survey, Urbana.
 University of Chicago.
 University of Illinois, Urbana.

INDIANA:

Academy of Sciences, Indianapolis.
 Agricultural Experiment Station, Indianapolis.
 Butler University, Indianapolis.
 Indiana Department of Conservation, Indianapolis.
 Indiana University, Bloomington.
 John Herron Art Institute, Indianapolis.

Purdue University, Lafayette.
University of Notre Dame, Notre Dame.

IOWA:

Agricultural Experiment Station, Ames.
Historical, Memorial and Art Department, Des Moines.
Iowa Academy of Science, Des Moines.
Iowa Geological Survey, Des Moines.
Iowa Horticultural Society, Des Moines.
Iowa State College of Agriculture and Mechanical Arts, Ames.
University of Iowa, Iowa City.

KANSAS:

Academy of Science, Topeka.
Agricultural Experiment Station, Lawrence (gift).
State Board of Agriculture, Lawrence.
State Historical Society, Topeka.
University of Kansas, Lawrence.

KENTUCKY:

Kentucky Academy of Science, Lexington.
Kentucky Geological Survey, Frankfort.
Kentucky University, Lexington.

LOUISIANA:

Department of Conservation, Baton Rouge.
Howard Memorial Library, New Orleans (gift).
Louisiana State Museum, New Orleans (gift).

MAINE:

Bowdoin College, Brunswick.
Mount Desert Region, Biological Survey, Bar Harbor (gift).
Portland Society of Natural History, Portland.

MARYLAND:

Johns Hopkins University, Baltimore.
Maryland Institute, Baltimore.
Maryland State Board of Forestry, Baltimore.

MASSACHUSETTS:

Agricultural Experiment Station, Amherst.
American Academy of Arts and Sciences, Boston.

American Antiquarian Society, Worcester.

Boston Public Library, Boston.
Boston Society of Natural History, Boston.

Clark University, Worcester.
Essex Institute, Salem.
Harvard College, Museum of Comparative Zoology, Cambridge.
Harvard University, Arnold Arboretum, Jamaica Plain.

Harvard University, Department of Mines and Petrography, Cambridge.

Harvard University, Gray Herbarium, Cambridge.

Horticultural Society, Boston.
Marine Biological Laboratory, Woods Hole.

Museum of Fine Arts, Boston.
New Bedford Public Library, New Bedford.

Peabody Institute, Salem.
Peabody Museum, Cambridge.
Smith College, Northampton.
Springfield City Library Association, Springfield.

Williams College, Williamstown.
Worcester County Horticultural Society, Worcester.

MICHIGAN:

Agricultural Experiment Station, Agricultural College.

Detroit Institute of Art, Detroit.
Grand Rapids Public Library, Grand Rapids.

Michigan Academy of Science, Arts and Letters, Ann Arbor.

Michigan College of Mines, Houghton.

Public Library, Menominee (gift).
State Board of Agriculture, Lansing.

Edward K. Warren Foundation, Three Oaks.

University of Michigan, Ann Arbor.

MINNESOTA:

Agricultural Experiment Station, University Farm.

Minneapolis Institute of Arts, Minneapolis.

Minnesota Historical Society, St. Paul.

University of Minnesota, Minneapolis.

MISSISSIPPI:

Agricultural Experiment Station, Agricultural College.

Mississippi Plant Board, Agricultural College.

MISSOURI:

Agricultural Experiment Station,
Columbia.
City Art Museum, St. Louis.
Missouri Botanic Garden, St. Louis.
Missouri Historical Society, Colum-
bia.
St. Louis Public Library, St. Louis.
Silica Products Company, Kansas
City (gift).
University of Missouri, School of
Mines, Rolla.
Washington University, St. Louis.

MONTANA:

State University, Bozeman.

NEBRASKA:

State University, Lincoln.

NEVADA:

Nevada University, Agricultural Ex-
periment Station, Carson City.

NEW JERSEY:

Agricultural Experiment Station,
Trenton.
Department of Agriculture, Trenton
(gift).
Newark Museums Association, New-
ark.
Princeton University, Princeton.

NEW MEXICO:

Agricultural Experiment Station,
Santa Fe.
Historical Society, Santa Fe.
New Mexico Museum, Santa Fe.

NEW YORK:

Agricultural Experiment Station,
Geneva.
American Academy of Rome, New
York.
American Geographical Society, New
York.
American Museum of Natural His-
tory, New York.
American Polish Chamber of Com-
merce, New York (gift).
Bingham Oceanographic Collection,
New York (gift).
Boyce Thompson Institute, Yonkers
(gift).
Brooklyn Botanic Garden, Brooklyn.
Brooklyn Institute of Arts and
Sciences, Brooklyn.
Buffalo Society of Natural Sciences,
Buffalo.
Columbia University, New York.
Cornell University, Ithaca.

Garden Club of America, New York
(gift).
Italy-American Society, New York
(gift).
Japan Society, New York (gift).
Metropolitan Museum of Art, New
York.
Motion Picture Producers and Dis-
tributors of America, New York
(gift).
Municipal Museum, Rochester.
Museum of the American Indian,
New York.
National Sculpture Society, New
York (gift).
New York Academy of Sciences,
New York.
New York Botanical Garden, New
York.
New York Historical Society, New
York.
New York State Library, Albany.
Oil and Fat Industries, New York
(gift).
Pratt Institute, New York.
Public Library, New York.
Rochester Academy of Science,
Rochester.
Soap, New York (gift).
Spanish Tourist Information Office,
New York (gift).
Spice Mill, New York (gift).
State College of Forestry, Syracuse.
State Museum, Albany.
Staten Island Institution of Arts
and Sciences, New York.
Stone Publishing Company, New
York (gift).
Tompkins-Kiel Marble Company,
New York (gift).
Union College, Schenectady.
United Fruit Company, New York
(gift).
University of the State of New York,
Albany.
Vanderbilt Marine Museum, New
York (gift).
Vassar College, Poughkeepsie.
Yonkers Museum of Science and
Art, Yonkers (gift).
Zoological Society, New York.

NORTH CAROLINA:

Duke University, Durham.
Elisha Mitchell Scientific Society,
Chapel Hill.

NORTH DAKOTA:

Agricultural Experiment Station,
University (gift).
State Historical Society, Bismarck.
University of North Dakota, Uni-
versity.

OHIO:

Agricultural Experiment Station,
Wooster.
Cincinnati Museums Association,
Cincinnati.
Cleveland Museum of Art, Cleve-
land.
Cleveland Museum of Natural His-
tory, Cleveland.
Cleveland Public Library, Cleveland.
Denison University, Granville.
Geological Survey, Columbus.
Junior Society of Natural Sciences,
Cincinnati (gift).
Oberlin College, Oberlin.
Ohio Academy of Science, Columbus.
Ohio Archaeological and Historical
Society, Columbus.
Ohio State Museum, Columbus.
Ohio State University, Columbus.
Wilson Ornithological Club, Oberlin.

OKLAHOMA:

Oklahoma Academy of Sciences, Nor-
man.
Oklahoma Geological Survey, Nor-
man.
University of Oklahoma, Norman.

OREGON:

Agricultural Experiment Station,
Corvallis.
University of Oregon, Eugene.

PENNSYLVANIA:

Academy of Natural Sciences, Phila-
delphia.
Agricultural Experiment Station,
Harrisburg.
American Philosophical Society, Phila-
delphia.
Antivenin Institute of America,
Philadelphia.
Armstrong Cork Company, Lan-
caster (gift).
Board of Fish Commissioners, Harris-
burg (gift).
Bureau of Topographical and Geo-
logical Survey, Harrisburg.
Carnegie Institute, Pittsburgh.
Carnegie Museum, Pittsburgh.
Commercial Museum, Philadelphia.
Department of Agriculture, Harris-
burg.
Department of Forests and Waters,
Harrisburg.
Dropsie College, Philadelphia.
Engineers' Society of Western Penn-
sylvania, Pittsburgh.
Erie Public Museum, Erie.
Franklin Institute, Philadelphia.
Lehigh University, Bethlehem.

Pennsylvania Museum and School
of Industrial Art, Philadelphia.
Philadelphia College of Pharmacy,
Philadelphia.
Sullivant Moss Society, Pittsburgh.
University of Pennsylvania, Phila-
delphia.
University of Pennsylvania, Mu-
seum, Philadelphia.
Wagner Free Institute of Science,
Philadelphia.

PHILIPPINE ISLANDS:

Bureau of Education, Manila.
Bureau of Forestry, Manila.
Bureau of Science, Manila.
Department of Agriculture and Na-
tural Resources, Manila.

RHODE ISLAND:

Roger Williams Park Museum, Prov-
idence.

SOUTH DAKOTA:

State School of Mines, Rapid City.

TENNESSEE:

Agricultural Experiment Station,
Nashville.

TEXAS:

Agricultural Experiment Station,
College Station.
Baylor University, Waco.
Conservation of Wild Life, Austin
(gift).
San Antonio Museums Association,
San Antonio.
Scientific Society, San Antonio.
University of Texas, Austin.

UTAH:

Agricultural Experiment Station,
Logan.

VERMONT:

Agricultural Experiment Station,
Burlington.

VIRGINIA:

State Forester, Richmond.
State Library, Richmond.
University of Virginia, Charlottes-
ville.

WASHINGTON (State of):

Agricultural Experiment Station,
Seattle.
Mountaineer Club, Seattle.
Pacific Northwest Bird and Mammal
Society, Seattle.
Washington University, Seattle.
Washington University, Historical
Society, Seattle.

WASHINGTON, D.C.:

American Association for the Advancement of Science.
 American Association of Museums.
 American Mining Congress.
 Archaeological Institute of America.
 Carnegie Institution of Washington (gift).
 Library of Congress.
 National Academy of Science.
 National Parks Bulletin.
 National Research Council.
 Pan-American Union.
 Science Service.
 Smithsonian Institution.
 Tropical Plant Research Foundation.
 United States Government.
 United States National Museum.

WEST VIRGINIA:

State Department of Agriculture,
 Charleston.
 West Virginia University, Morgantown.

WISCONSIN:

Agricultural Experiment Station,
 Madison.
 Beloit College, Beloit.
 Geological and Natural History Survey,
 Madison.
 Logan Museum, Beloit.
 Public Museum of Milwaukee, Milwaukee.
 State Horticultural Society, Madison.
 University of Wisconsin, Madison.
 Washington Park Zoological Society,
 Milwaukee.
 Wisconsin Academy of Arts, Sciences
 and Letters, Madison.
 Wisconsin Archaeological Society,
 Madison.

WYOMING:

State Geologist, Cheyenne.

INDIVIDUALS

(Accessions are by gift unless otherwise designated)

Abe, Fusajiro, Sumiyoshi, near Kobe,
 Japan.
 Adams, J., Ottawa, Ontario, Canada.
 Ames, Oakes, Cambridge, Massachusetts.

Babcock, Louis L., Buffalo, New York.
 Baerg, W. J., Columbus, Ohio.
 Bailey, Liberty Hyde, Ithaca, New York
 (exchange).
 M. Baranoff, Belgrade, Yugoslavia.
 Bassler, R. S., Washington, D.C.
 Beaux, Oscar de, Geneva, Switzerland
 (exchange).
 Benke, H. C., Chicago.
 Benton, Mabel M., Chicago.
 Berlioz, J., Paris, France (exchange).
 Berry, S. Stillman, Redlands, California.
 Beyer, H. O., Manila, Philippine Islands.
 Borodin, Nichols, Cambridge, Massachusetts.
 Buchanan, Francis, Patna, India.

Chauvet, Stéphen, Paris, France.
 Citroën, André, Detroit, Michigan.
 Clark, Herbert C., Panama City, Panama.
 Cockerell, T. D. A., Boulder, Colorado.
 Collins, Charles, Evanston, Illinois.
 Compton, F. E., and Company, Chicago.
 Cook, Harold J., Agate, Colorado.
 Cornell, Margaret M., Chicago.
 Coze, Paul, Paris, France.

Dahlgren, B. E., Chicago.
 Ditzel, Henry F., Chicago.
 Domin, Karel, Prague.
 Duncan, George, Washington, D.C.
 Dunod, H., Paris, France.

Evans, Alexander W., New Haven,
 Connecticut.

Fabiani, Ramiro, Palermo, Sicily.
 Farwell, Oliver A., Detroit, Michigan.
 Fernald, M. L., Cambridge, Massachusetts.
 Field, Henry, Chicago.
 Field, Stanley, Chicago.
 Friedlander und Sohn, Berlin, Germany.
 Frödl, Friedrich, Brunn, Austria.

Gates, F. C., Manhattan, Kansas.
 Gee, N. Gist, Peiping, China.
 Gerhard, William J., Chicago.
 Gladwin, Harold S., Pasadena, California.
 Green, Morris M., Ardmore, Pennsylvania.
 Gregg, Clifford C., Park Ridge, Illinois.
 Gregory, William K., New York.
 Gunder, J. D., Pasadena, California.
 Gusinde, Martin, Mödling, Vienna, Austria.

Haardt, Georges-Marie, Paris, France.
 Hatt, Robert T., New York (exchange).
 Heim, Albert, Zürich, Switzerland
 (exchange).

- Hendry, G. W., Berkeley, California.
Herrera, F. L., Cuzco, Peru.
- Imbelloni, José, Paraná, Argentina.
- Jones, Marcus E., Claremont, California (exchange).
Judd, Neil M., Washington, D.C. (exchange).
- Karutz, Richard, Stuttgart, Germany.
Kroeber, A. L., Berkeley, California (exchange).
- Lahille, F., Buenos Aires, Argentina.
Laufer, Dr. Berthold, Chicago.
Lewis, Dr. Albert B., Chicago.
Loth, E., Warsaw, Poland.
Love, Charles A., Aurora, Illinois.
- MacCurdy, George, New Haven, Connecticut (exchange).
McNair, James B., Chicago.
Mauro, Francesco, Milan, Italy.
Mertens, Robert, Frankfort on the Main, Germany.
Meylan, O., Mies, Bohemia.
Mogensen, Johan, Copenhagen, Denmark.
Moodie, Roy L., Santa Monica, California.
Morse, Albert P., Salem, Massachusetts.
Motohashi, Heichoro, Tottori, Japan.
Mottaz, Charles, Geneva, Switzerland.
Mullerried, Federico, Mexico.
- Nelson, E. W., and Goldman, E. A., Washington, D.C.
Nordenskiöld, Erland, Göteborg.
North, Robert C., New York.
- Olbrechts, F., Brussels, Belgium.
Osborn, Dr. Henry Fairfield, New York.
Osgood, Dr. Wilfred H., Chicago.
- Pammel, Louis H., Ames, Iowa (exchange).
Parodi, Lorenzo R., Buenos Aires, Argentina.
Peters, James L., Cambridge, Massachusetts (exchange).
Pettazoni, R., Rome, Italy.
Pfeiffer, C. A., New York.
Pittier, Henry, Caracas, Venezuela (exchange).
- Porter, Carlos E., Santiago, Chile (exchange).
Potter, Frank C., Chicago.
Psota, Frank J., Chicago.
- Ravn, O. E., Copenhagen, Denmark.
Reed, W. M., New York.
Riggs, Elmer S., Chicago.
Rivet, Paul, Paris, France (exchange).
Rösch, Siegfried, Leipzig, Germany.
- St. John, Harold, Seattle, Washington.
Sanborn, Colin C., Chicago.
Sanchez y Roig, Mario, Havana, Cuba.
Sarkar, Benoy Kumar, Munich, Germany.
Schinz, Hans, Zürich, Switzerland (exchange).
Schlaginhaufen, Otto, Zürich, Switzerland (exchange).
Schmidt, Karl P., Chicago.
Sherff, Earl E., Chicago.
Simms, Stephen C., Chicago.
Spencer, L. J., London, England.
Standley, Paul C., Chicago.
Sternberg, C. M., McKittrick, California.
Stevens, H., London, England.
Stiles, C. Wardell, Washington, D.C.
Strand, Embrik, Riga, U.S.S.R.
Strausbaugh, P. D., Morgantown, West Virginia.
Streeter, Lafayette P., Avalon, California.
- Tanaka, Shigeo, Tokyo, Japan (exchange).
Terron, Carlos C., Chapultepec, Mexico.
Thompson, J. Eric, Chicago.
- Vignati, Milciades A., Buenos Aires, Argentina.
- Ward, F. Kingdon, Clifton Hill, Australia.
Weber, Walter A., Chicago, Illinois (exchange).
Whitnall, Harold O., Hamilton, New York.
Whittard, W. F., London, England.
Williams, Llewelyn, Chicago.
Wilson, H. V., Chapel Hill, North Carolina.
- Zammarano, V. T., Rome, Italy.
Zimmer, John T., New York.

ARTICLES OF INCORPORATION

STATE OF ILLINOIS

DEPARTMENT OF STATE

WILLIAM H. HINRICHSSEN, *Secretary of State*

TO ALL TO WHOM THESE PRESENTS SHALL COME, GREETING:

Whereas, a Certificate duly signed and acknowledged having been filed in the office of the Secretary of State, on the 16th day of September, A.D. 1893, for the organization of the COLUMBIAN MUSEUM OF CHICAGO, under and in accordance with the provisions of "An Act Concerning Corporations," approved April 18, 1872, and in force July 1, 1872, and all acts amendatory thereof, a copy of which certificate is hereto attached.

Now, therefore, I, William H. Hinrichsen, Secretary of State of the State of Illinois, by virtue of the powers and duties vested in me by law, do hereby certify that the said COLUMBIAN MUSEUM OF CHICAGO is a legally organized Corporation under the laws of this State.

In Testimony Whereof, I hereto set my hand and cause to be affixed the Great Seal of State. Done at the City of Springfield, this 16th day of September, in the year of our Lord one thousand eight hundred and ninety-three, and of the Independence of the United States the one hundred and eighteenth.

W. H. HINRICHSSEN,

[SEAL]

Secretary of State.

TO HON. WILLIAM H. HINRICHSSEN,

SECRETARY OF STATE:

SIR:

We, the undersigned citizens of the United States, propose to form a corporation under an act of the General Assembly of the State of Illinois, entitled "An Act Concerning Corporations," approved April 18, 1872, and all acts amendatory thereof; and that for the purposes of such organization we hereby state as follows, to-wit:

1. The name of such corporation is the "COLUMBIAN MUSEUM OF CHICAGO."

2. The object for which it is formed is for the accumulation and dissemination of knowledge, and the preservation and exhibition of objects illustrating Art, Archaeology, Science and History.

3. The management of the aforesaid museum shall be vested in a Board of FIFTEEN (15) TRUSTEES, five of whom are to be elected every year.

4. The following named persons are hereby selected as the Trustees for the first year of its corporate existence:

Edward E. Ayer, Charles B. Farwell, George E. Adams, George R. Davis, Charles L. Hutchinson, Daniel H. Burnham, John A. Roche, M. C. Bullock, Emil G. Hirsch, James W. Ellsworth, Allison V. Armour, O. F. Aldis, Edwin Walker, John C. Black and Frank W. Gunsaulus.

5. The location of the Museum is in the City of Chicago, County of Cook, and State of Illinois.

(Signed)

George E. Adams, C. B. Farwell, Sidney C. Eastman, F. W. Putnam, Robert McCurdy, Andrew Peterson, L. J. Gage, Charles L. Hutchinson, Ebenezer Buckingham, Andrew McNally, Edward E. Ayer, John M. Clark, Herman H. Kohlsaat, George Schneider, Henry H. Getty, William R. Harper, Franklin H.

Head, E. G. Keith, J. Irving Pearce, Azel F. Hatch, Henry Wade Rogers, Thomas B. Bryan, L. Z. Leiter, A. C. Bartlett, A. A. Sprague, A. C. McClurg, James W. Scott, Geo. F. Bissell, John R. Walsh, Chas. Fitzsimmons, John A. Roche, E. B. McCagg, Owen F. Aldis, Ferdinand W. Peck, James H. Dole, Joseph Stockton, Edward B. Butler, John McConnell, R. A. Waller, H. C. Chatfield-Taylor, A. Crawford, Wm. Sooy Smith, P. S. Peterson, John C. Black, Jno. J. Mitchell, C. F. Gunther, George R. Davis, Stephen A. Forbes, Robert W. Patterson, Jr., M. C. Bullock, Edwin Walker, George M. Pullman, William E. Curtis, James W. Ellsworth, William E. Hale, Wm. T. Baker, Martin A. Ryerson, Huntington W. Jackson, N. B. Ream, Norman Williams, Melville E. Stone, Bryan Lathrop, Eliphalet W. Blatchford, Philip D. Armour.

STATE OF ILLINOIS }
COOK COUNTY } SS.

I, G. R. MITCHELL, a NOTARY PUBLIC in and for said County, do hereby certify that the foregoing petitioners personally appeared before me and acknowledged severally that they signed the foregoing petition as their free and voluntary act for the uses and purposes therein set forth.

Given under my hand and notarial seal this 14th day of September, 1893.

G. R. MITCHELL,

[SEAL]

NOTARY PUBLIC, COOK COUNTY, ILL.

CHANGE OF NAME

Pursuant to a resolution passed at a meeting of the corporate members held the 25th day of June, 1894, the name of the COLUMBIAN MUSEUM was changed to FIELD COLUMBIAN MUSEUM. A certificate to this effect was filed June 26, 1894, in the office of the Secretary of State for Illinois.

CHANGE OF NAME

Pursuant to a resolution passed at a meeting of the corporate members held the 8th day of November, 1905, the name of the FIELD COLUMBIAN MUSEUM was changed to FIELD MUSEUM OF NATURAL HISTORY. A certificate to this effect was filed November 10, 1905, in the office of the Secretary of State for Illinois.

CHANGE IN ARTICLE 3

Pursuant to a resolution passed at a meeting of the corporate members held the 10th day of May, 1920, the management of FIELD MUSEUM OF NATURAL HISTORY shall be invested in a Board of TWENTY-ONE (21) TRUSTEES, who shall be elected in such manner and for such time and term of office as may be provided for by the By-Laws. A certificate to this effect was filed May 21, 1920, in the office of the Secretary of State for Illinois.

AMENDED BY-LAWS

JANUARY 1930

ARTICLE I

MEMBERS

SECTION 1. Members shall be of twelve classes, Corporate Members, Honorary Members, Patrons, Corresponding Members, Benefactors, Contributors, Life Members, Non-Resident Life Members, Associate Members, Non-Resident Associate Members, Sustaining Members, and Annual Members.

SECTION 2. The Corporate Members shall consist of the persons named in the articles of incorporation, and of such other persons as shall be chosen from time to time by the Board of Trustees at any of its meetings, upon the recommendation of the Executive Committee; provided, that such person named in the articles of incorporation shall, within ninety days from the adoption of these By-Laws, and persons hereafter chosen as Corporate Members shall, within ninety days of their election, pay into the treasury the sum of Twenty Dollars (\$20.00) or more. Corporate Members becoming Life Members, Patrons or Honorary Members shall be exempt from dues. Annual meetings of said Corporate Members shall be held at the same place and on the same day that the annual meeting of the Board of Trustees is held.

SECTION 3. Honorary Members shall be chosen by the Board from among persons who have rendered eminent service to science, and only upon unanimous nomination of the Executive Committee. They shall be exempt from all dues.

SECTION 4. Patrons shall be chosen by the Board upon recommendation of the Executive Committee from among persons who have rendered eminent service to the Museum. They shall be exempt from all dues, and, by virtue of their election as Patrons, shall also be Corporate Members.

SECTION 5. Any person contributing or devising the sum of One Hundred Thousand Dollars (\$100,000.00) in cash, or securities, or property to the funds of the Museum, may be elected a Benefactor of the Museum.

SECTION 6. Corresponding Members shall be chosen by the Board from among scientists or patrons of science residing in foreign countries, who render important service to the Museum. They shall be elected by the Board of Trustees at any of its meetings. They shall be exempt from all dues and shall enjoy all courtesies of the Museum.

SECTION 7. Any person contributing to the Museum the sum of One Thousand Dollars (\$1,000.00) or more in cash, securities, or material, may be elected a Contributor of the Museum. Contributors shall be exempt from all dues and shall enjoy all courtesies of the Museum.

SECTION 8. Any person paying into the treasury the sum of Five Hundred Dollars (\$500.00), at any one time, shall, upon the unanimous vote of the Board, become a Life Member. Life Members shall be exempt from all dues, and shall enjoy all the privileges and courtesies of the Museum that are accorded to members of the Board of Trustees. Any person residing fifty miles or more from the city of Chicago, paying into the treasury the sum of One Hundred Dollars (\$100.00) at any one time, shall, upon the unanimous vote of the Board, become a Non-Resident Life Member. Non-Resident Life Members shall be exempt from all dues, and shall enjoy all the privileges and courtesies of the Museum that are accorded to members of the Board of Trustees.

SECTION 9. Any person paying into the treasury of the Museum the sum of One Hundred Dollars (\$100.00), at any one time, shall, upon the unanimous vote of the Board, become an Associate Member. Associate Members shall be exempt from all dues, and shall be entitled to tickets admitting member and members of family, including non-resident home guests; all publications of the Museum, if so desired; reserved seats for all lectures and entertainments under the auspices

of the Museum, provided reservation is requested in advance; and admission of holder of membership and accompanying party to all special exhibits and Museum functions day or evening. Any person residing fifty miles or more from the city of Chicago, paying into the treasury the sum of Fifty Dollars (\$50.00) at any one time, shall, upon the unanimous vote of the Board, become a Non-Resident Associate Member. Non-Resident Associate Members shall be exempt from all dues, and shall enjoy all the privileges and courtesies of the Museum that are accorded to Associate Members.

SECTION 10. Sustaining Members shall consist of such persons as are selected from time to time by the Board of Trustees at any of its meetings, and who shall pay an annual fee of Twenty-five Dollars (\$25.00), payable within thirty days after notice of election and within thirty days after each recurring annual date. This Sustaining Membership entitles the member to free admission for the member and family to the Museum on any day, the Annual Report and such other Museum documents or publications as may be requested in writing. When a Sustaining Member has paid the annual fee of \$25.00 for six years, such member shall be entitled to become an Associate Member.

SECTION 11. Annual Members shall consist of such persons as are selected from time to time by the Board of Trustees at any of its meetings, and who shall pay an annual fee of Ten Dollars (\$10.00), payable within thirty days after each recurring annual date. An Annual Membership shall entitle the member to a card of admission for the member and family during all hours when the Museum is open to the public, and free admission for the member and family to all Museum lectures or entertainments. This membership will also entitle the holder to the courtesies of the membership privileges of every Museum of note in the United States and Canada, so long as the existing system of co-operative interchange of membership tickets shall be maintained, including tickets for any lectures given under the auspices of any of the Museums during a visit to the cities in which the cooperative museums are located.

SECTION 12. All membership fees, excepting Sustaining and Annual, shall hereafter be applied to a permanent Membership Endowment Fund, the interest only of which shall be applied for the use of the Museum as the Board of Trustees may order.

ARTICLE II

BOARD OF TRUSTEES

SECTION 1. The Board of Trustees shall consist of twenty-one members. The respective members of the Board now in office, and those who shall hereafter be elected, shall hold office during life. Vacancies occurring in the Board shall be filled at a regular meeting of the Board, upon the nomination of the Executive Committee made at a preceding regular meeting of the Board, by a majority vote of the members of the Board present.

SECTION 2. Regular meetings of the Board shall be held on the third Monday of each month. Special meetings may be called at any time by the President, and shall be called by the Secretary upon the written request of three Trustees. Five Trustees shall constitute a quorum, except for the election of officers or the adoption of the Annual Budget, when seven Trustees shall be required, but meetings may be adjourned by any less number from day to day, or to a day fixed, previous to the next regular meeting.

SECTION 3. Reasonable written notice, designating the time and place of holding meetings, shall be given by the Secretary.

ARTICLE III

HONORARY TRUSTEES

SECTION 1. As a mark of respect, and in appreciation of services performed for the Institution, those Trustees who by reason of inability, on account of change of residence, or for other cause or from indisposition to serve longer in such capacity shall resign their place upon the Board, may be elected, by a majority of those present at any regular meeting of the Board, an Honorary Trustee for life.

Such Honorary Trustee will receive notice of all meetings of the Board of Trustees, whether regular or special, and will be expected to be present at all such meetings and participate in the deliberations thereof, but an Honorary Trustee shall not have the right to vote.

ARTICLE IV

OFFICERS

SECTION 1. The officers shall be a President, a First Vice-President, a Second Vice-President, a Third Vice-President, a Secretary, an Assistant Secretary and a Treasurer. They shall be chosen by ballot by the Board of Trustees, a majority of those present and voting being necessary to elect. The President, the First Vice-President, the Second Vice-President, and the Third Vice-President shall be chosen from among the members of the Board of Trustees. The meeting for the election of officers shall be held on the third Monday of January of each year, and shall be called the Annual Meeting.

SECTION 2. The officers shall hold office for one year, or until their successors are elected and qualified, but any officer may be removed at any regular meeting of the Board of Trustees by a vote of two-thirds of all the members of the Board. Vacancies in any office may be filled by the Board at any meeting.

SECTION 3. The officers shall perform such duties as ordinarily appertain to their respective offices, and such as shall be prescribed by the By-Laws, or designated from time to time by the Board of Trustees.

ARTICLE V

THE TREASURER

SECTION 1. The Treasurer shall be custodian of the funds of the Corporation except as hereinafter provided. He shall make disbursements only upon warrants drawn by the Director and countersigned by the President. In the absence or inability of the Director, warrants may be signed by the Chairman of the Finance Committee, and in the absence or inability of the President, may be countersigned by one of the Vice-Presidents, or any member of the Finance Committee.

SECTION 2. The securities and muniments of title belonging to the corporation shall be placed in the custody of some Trust Company of Chicago to be designated by the Board of Trustees, which Trust Company shall collect the income and principal of said securities as the same become due, and pay same to the Treasurer, except as hereinafter provided. Said Trust Company shall allow access to and deliver any or all securities or muniments of title to the joint order of the following officers, namely: the President or one of the Vice-Presidents, jointly with the Chairman, or one of the Vice-Chairmen, of the Finance Committee of the Museum.

SECTION 3. The Treasurer shall give bond in such amount, and with such sureties as shall be approved by the Board of Trustees.

SECTION 4. The Harris Trust & Savings Bank of Chicago shall be Custodian of "The N. W. Harris Public School Extension of Field Museum" fund. The bank shall make disbursements only upon warrants drawn by the Director and countersigned by the President. In the absence or inability of the Director, warrants may be signed by the Chairman of the Finance Committee, and in the absence or inability of the President, may be countersigned by one of the Vice-Presidents, or any member of the Finance Committee.

ARTICLE VI

THE DIRECTOR

SECTION 1. The Board of Trustees shall elect a Director of the Museum, who shall remain in office until his successor shall be elected. He shall have immediate charge and supervision of the Museum, and shall control the operations of the Institution, subject to the authority of the Board of Trustees and its Com-

mittees. The Director shall be the official medium of communication between the Board, or its Committees, and the scientific staff and maintenance force.

SECTION 2. There shall be four scientific Departments of the Museum—Anthropology, Botany, Geology and Zoology; each under the charge of a Curator, subject to the authority of the Director. The Curators shall be appointed by the Board upon the recommendation of the Director, and shall serve during the pleasure of the Board. Subordinate staff officers in the scientific Departments shall be appointed and removed by the Director upon the recommendation of the Curators of the respective Departments. The Director shall have authority to employ and remove all other employees of the Museum.

SECTION 3. The Director shall make report to the Board at each regular meeting, recounting the operations of the Museum for the previous month. At the Annual Meeting, the Director shall make an Annual Report, reviewing the work for the previous year, which Annual Report shall be published in pamphlet form for the information of the Trustees and Members, and for free distribution in such number as the Board may direct.

ARTICLE VII

AUDITOR

SECTION 1. The Board shall appoint an Auditor, who shall hold his office during the pleasure of the Board. He shall keep proper books of account, setting forth the financial condition and transactions of the Corporation, and of the Museum, and report thereon at each regular meeting, and at such other times as may be required by the Board. He shall certify to the correctness of all bills rendered for the expenditure of the money of the Corporation.

ARTICLE VIII

COMMITTEES

SECTION 1. There shall be five Committees, as follows: Finance, Building, Auditing, Pension and Executive.

SECTION 2. The Finance Committee shall consist of five members, the Auditing and Pension Committees shall each consist of three members, and the Building Committee shall consist of five members. All members of these four Committees shall be elected by ballot by the Board at the Annual Meeting, and shall hold office for one year, and until their successors are elected and qualified. In electing the members of these Committees, the Board shall designate the Chairman and Vice-Chairman by the order in which the members are named in the respective Committee; the first member named shall be Chairman, the second named the Vice-Chairman, and the third named, Second Vice-Chairman, succession to the Chairmanship being in this order in the event of the absence or disability of the Chairman.

SECTION 3. The Executive Committee shall consist of the President of the Board, the Chairman of the Finance Committee, the Chairman of the Building Committee, the Chairman of the Auditing Committee, the Chairman of the Pension Committee, and three other members of the Board to be elected by ballot at the Annual Meeting.

SECTION 4. Four members shall constitute a quorum of the Executive Committee, and in all standing Committees two members shall constitute a quorum. In the event that, owing to the absence or inability of members, a quorum of the regular elected members cannot be present at any meeting of any Committee, then the Chairman thereof, or his successor, as herein provided, may summon any members of the Board of Trustees to act in place of the absentee.

SECTION 5. The Finance Committee shall have supervision of investing the endowment and other permanent funds of the Corporation, and the care of such real estate as may become its property. It shall have authority to invest, sell, and reinvest funds, subject to the approval of the Board.

SECTION 6. The Building Committee shall have supervision of the construction, reconstruction, and extension of any and all buildings used for Museum purposes.

SECTION 7. The Executive Committee shall be called together from time to time as the Chairman may consider necessary, or as he may be requested to do by three members of the Committee, to act upon such matters affecting the administration of the Museum as cannot await consideration at the Regular Monthly Meetings of the Board of Trustees. It shall, before the beginning of each fiscal year, prepare and submit to the Board an itemized Budget, setting forth the probable receipts from all sources for the ensuing year, and make recommendations as to the expenditures which should be made for routine maintenance and fixed charges. Upon the adoption of the Budget by the Board, the expenditures stated are authorized.

SECTION 8. The Auditing Committee shall have supervision over all accounting and bookkeeping, and full control of the financial records. It shall cause the same, once each year, or oftener, to be examined by an expert individual or firm, and shall transmit the report of such expert individual or firm to the Board at the next ensuing regular meeting after such examination shall have taken place.

SECTION 9. The Pension Committee shall determine by such means and processes as shall be established by the Board of Trustees to whom and in what amount the Pension Fund shall be distributed. These determinations or findings shall be subject to the approval of the Board of Trustees.

SECTION 10. The Chairman of each Committee shall report the acts and proceedings thereof at the next ensuing regular meeting of the Board.

SECTION 11. The President shall be ex-officio a member of all Committees and Chairman of the Executive Committee. Vacancies occurring in any Committee may be filled by ballot at any regular meeting of the Board.

ARTICLE IX

NOMINATING COMMITTEE

SECTION 1. At the November meeting of the Board each year, a Nominating Committee of three shall be chosen by lot. Said Committee shall make nominations for membership of the Finance Committee, the Building Committee, the Auditing Committee, and the Pension Committee, and for three members of the Executive Committee, from among the Trustees, to be submitted at the ensuing December meeting and voted upon at the following Annual Meeting in January.

ARTICLE X

SECTION 1. Whenever the word "Museum" is employed in the By-Laws of the Corporation, it shall be taken to mean the building in which the Museum as an Institution is located and operated, the material exhibited, the material in study collections, or in storage, furniture, fixtures, cases, tools, records, books, and all appurtenances of the Institution and the workings, researches, installations, expenditures, field work, laboratories, library, publications, lecture courses, and all scientific and maintenance activities.

SECTION 2. These By-Laws may be amended at any regular meeting of the Board of Trustees by a two-thirds vote of all the members present, provided the amendment shall have been proposed at a preceding regular meeting.

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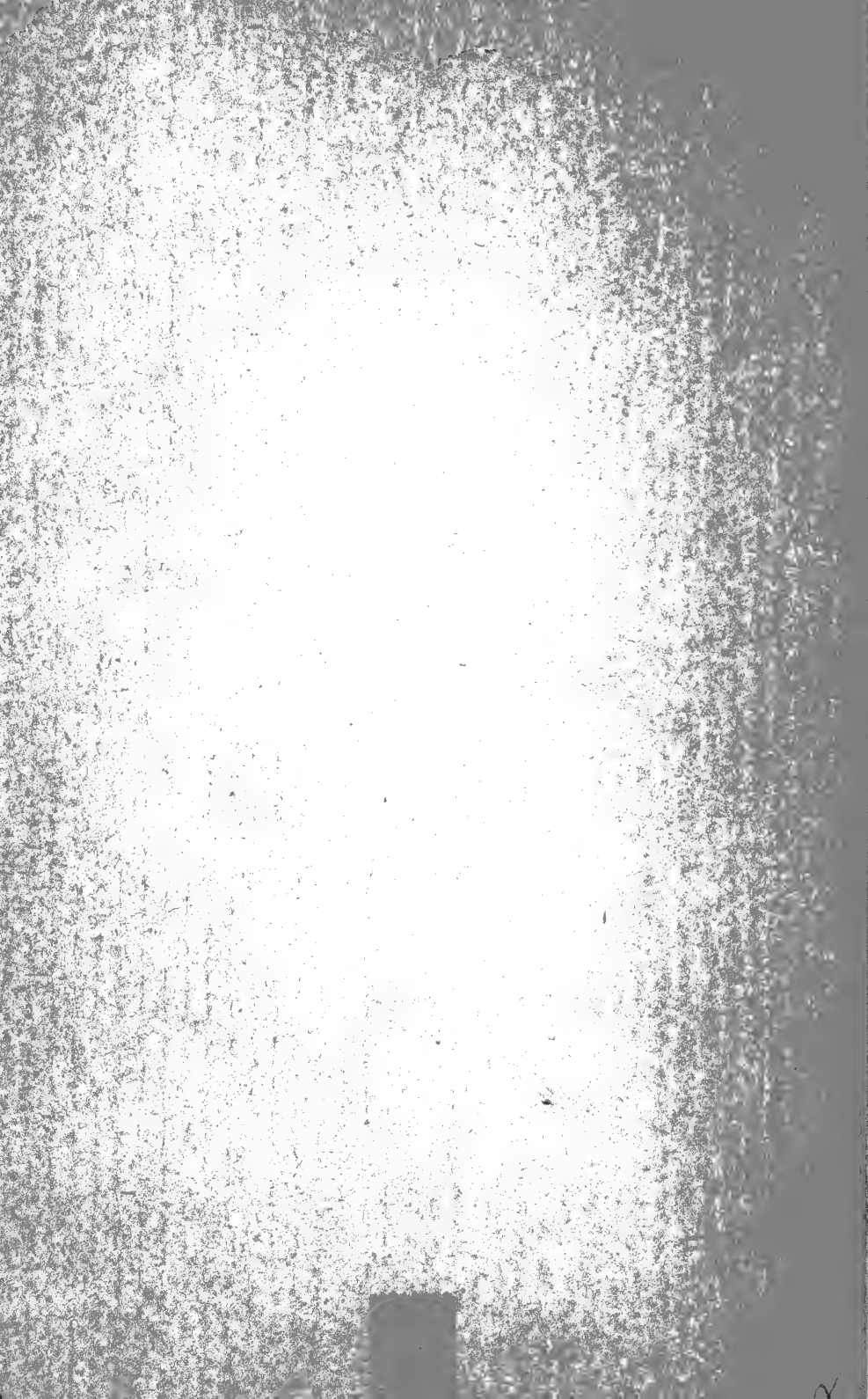
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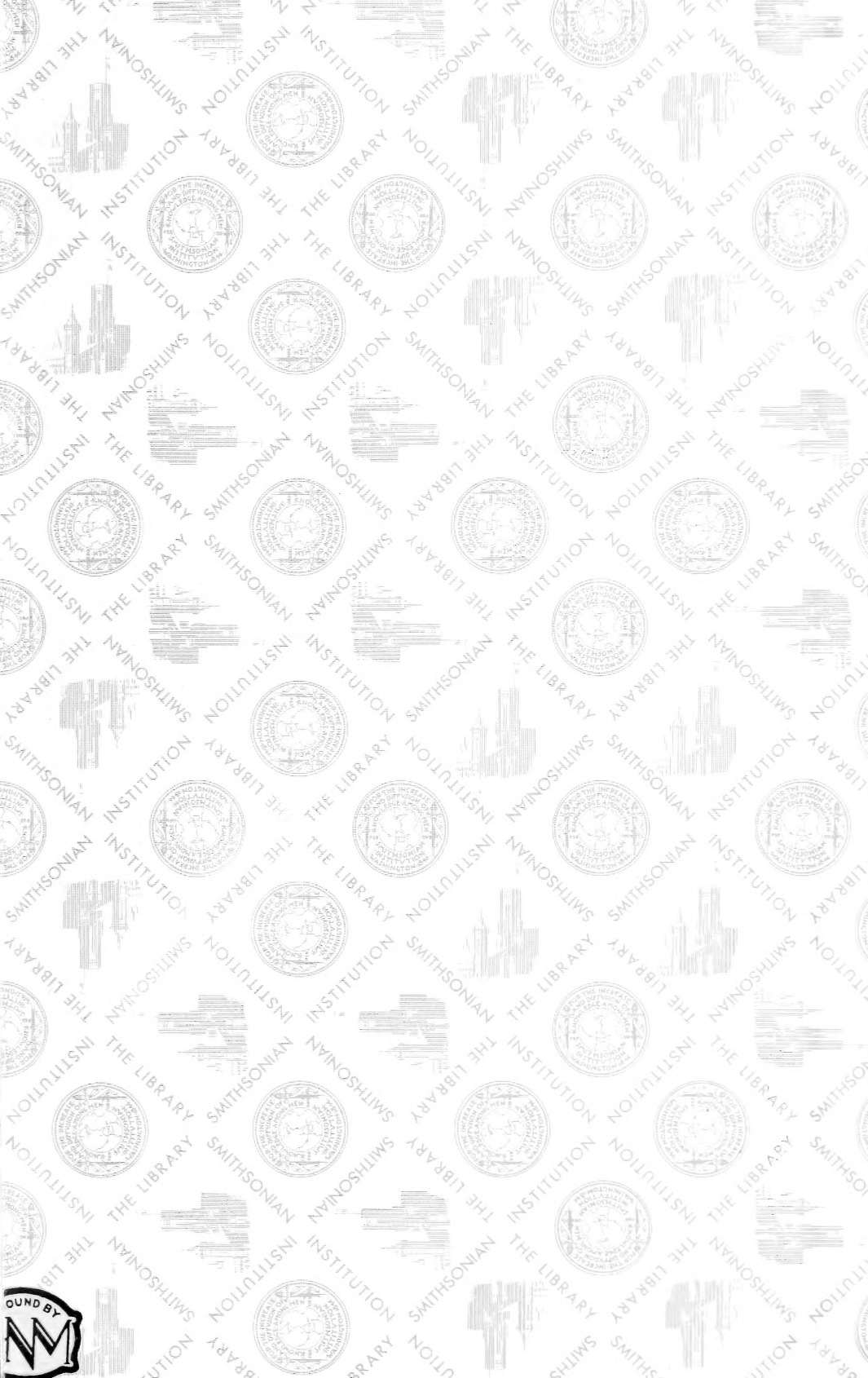
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